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The Farm Quarterly

Range Fertilization From The Air

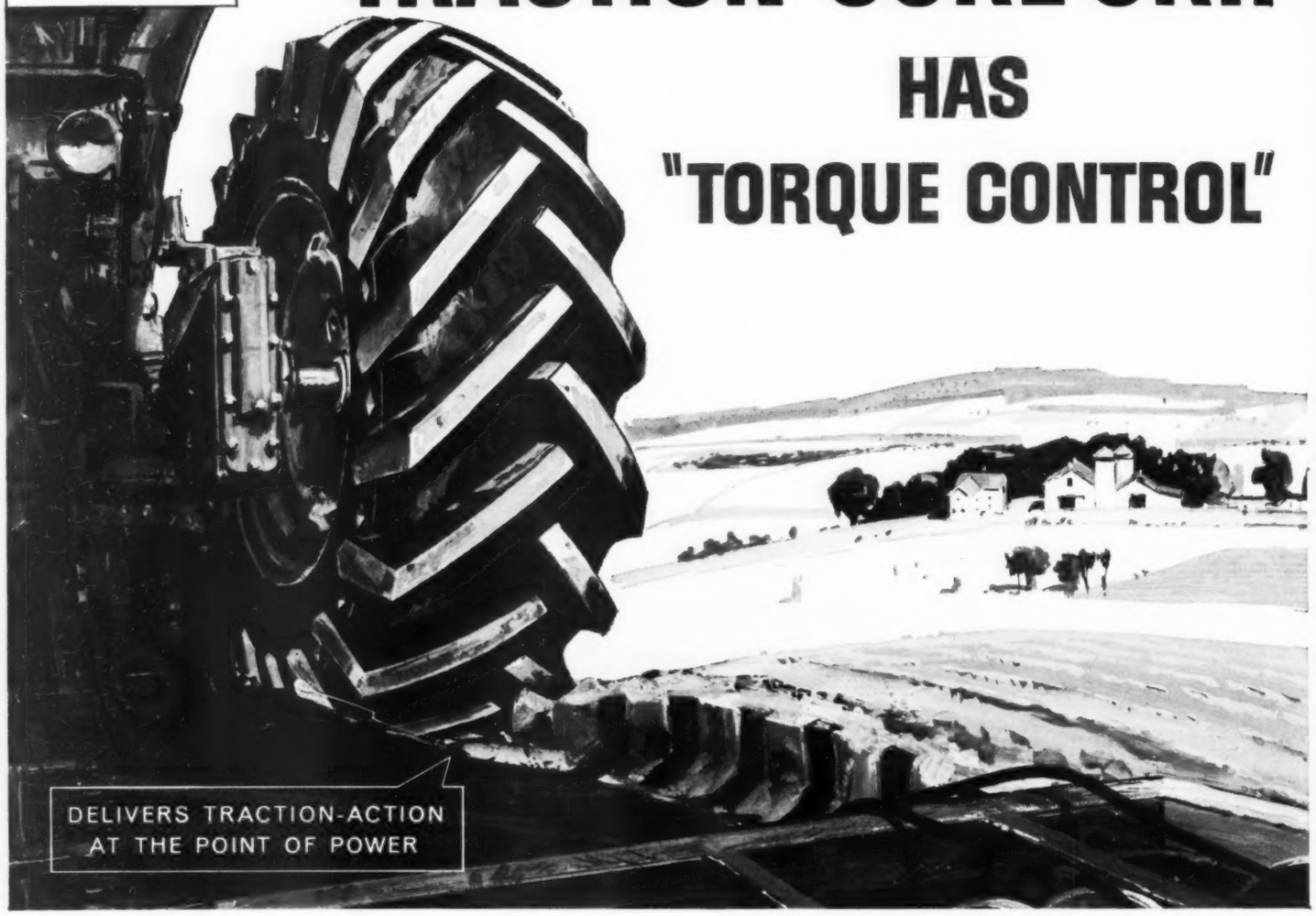
One-Farmer Vertical Integration

GOODYEAR TIRES

"They treat you fine at the Goodyear Sign!"

Is your tractor losing torque because of its tires?

TRACTION SURE-GRIP HAS "TORQUE CONTROL"



Torque has been boosted in the higher-powered tractors built during the past ten years. As much as 30% more drawbar pull is at your service.

But only a tire DESIGNED to harness it can make that torque pay off in extra travel per hour, in fuel savings per acre worked.

TRACTION SURE-GRIP is that tire! A look at the tread and shoulders will show you why.

Those extra-deep, ruler-straight lugs with "Wedge-In" action get a solid vise-like grip on the soil. The lugs extend the full width of the tire—and down to the sidewalls for extra traction. Wheel-spin—even in a muddy field—is cut way down.

And bruises, buckle breaks, cracks and rim slippage have met their master, too. Goodyear 3-T Cord – triple-toughened by an exclusive process involving Tension, Temperature and Time—fights these troubles to a virtual standstill.

Here's the tractor tire that pays back its cost faster—and keeps on saving you money. See it on the new, more powerful tractors – or call your Goodyear dealer. Goodyear, Farm Tire Dept., Akron 16, Ohio.

FARM TIRES BY

GOODYEAR

Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

MORE FARMERS PREFER GOODYEAR TRACTOR TIRES THAN ANY OTHER KIND!

SEP 18 1959

Tough job?
They take it in stride

Styled for town, new INTERNATIONAL pickups with Bonus-Load bodies are "farm tough." Economical "sixes" or spirited V-8's.

Pleasant job?
They handle it in style

New INTERNATIONAL Travelall® rides eight grownups handsomely. Hauls equipment, feed, what-have-you—on or off the road.

Take six people, plus a pickup load, in unique new Travelette®.

Stake and platform models bring regular or all-wheel drive to farm jobs.

Perishable goods move swiftly, easily with compact-design models.

Whatever the job, they do it *right!*

See your INTERNATIONAL Dealer.

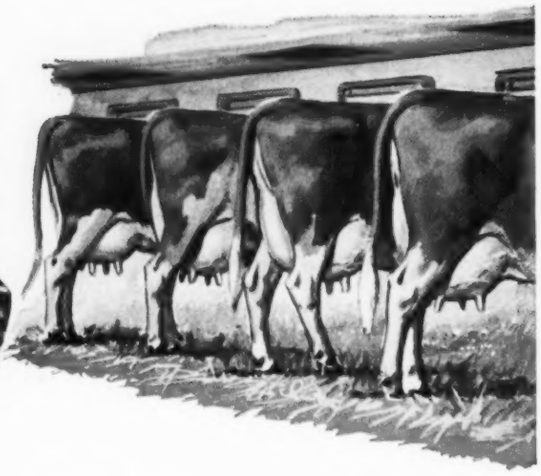
INTERNATIONAL® TRUCKS

WORLD'S MOST COMPLETE LINE

INTERNATIONAL HARVESTER COMPANY, CHICAGO • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

Farm Quarterly, Vol. Fourteen, No. Three. Editorial, Circulation and Executive Offices, 22 East 12th Street, Cincinnati, Ohio. Published quarterly by F. & W. Publishing Corp. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the United States and Canada. Entered as second-class matter at the Post Office, Cincinnati, Ohio, under the Act of March 3, 1879. (Title Reg. U.S. Pat. Off.)

An investment that pays dividends of more than 500%



ANIMAL HEALTH ENGINEERING
as practiced by
YOUR VETERINARIAN

"For every dollar a livestock owner invests in veterinary services, it is estimated he gets a return of $5.78 on his investment*", says Dr. C. D. Van Houweling, Agricultural Research Service, United States Department of Agriculture.

WHETHER YOU OWN LIVESTOCK FOR MEAT OR MILK, an investment in Animal Health Engineering, as practiced by your veterinarian, pays tremendous dividends. This has been proved again and again by progressive livestockmen in every section of America.

HEALTHIER ANIMALS, HEALTHIER PROFITS. Animal Health Engineering is the all-inclusive program your veterinarian uses to help you keep your animals at the peak of their health and productivity. Through this program, he "watches over" the physical condition of your livestock. Each time he calls, all the resources of modern veterinary science call with him.

TRAINING, EXPERIENCE, SKILL. When your veterinarian examines your animals, his practiced eye is searching for warning symptoms of disease – profit-robbing disease that may run through your entire herd unless quickly recognized and brought under control.

He brings to your farm or ranch the most advanced techniques of disease prevention, diagnosis, treatment and surgery. He's your private "answer man" for the thousand and one questions which continually arise concerning animals, their nutrition and care. *If you raise livestock for meat, ask him about the 3 remarkable new Synovex balanced hormone implants – one for steers, one for heifers, one for lambs – which improve weight gains and feed conversion up to 20%.*

NEW KNOWLEDGE, NEW DRUGS. When disease strikes your herd, your veterinarian treats them with the most modern methods and the newest, most effective drugs. Perhaps he may choose a drug produced by E. R. Squibb & Sons. When he does, you can be confident there is no finer, more potent, more thoroughly tested drug of its kind available anywhere today. Remember SQUIBB – A NAME YOU CAN TRUST.

E. R. SQUIBB & SONS, *Veterinary Department*
745 Fifth Avenue, New York 22, N. Y.

SQUIBB A NAME YOU CAN TRUST

*Figures based on a study made by the Veterinary Services Committee of the American Veterinary Medical Association.

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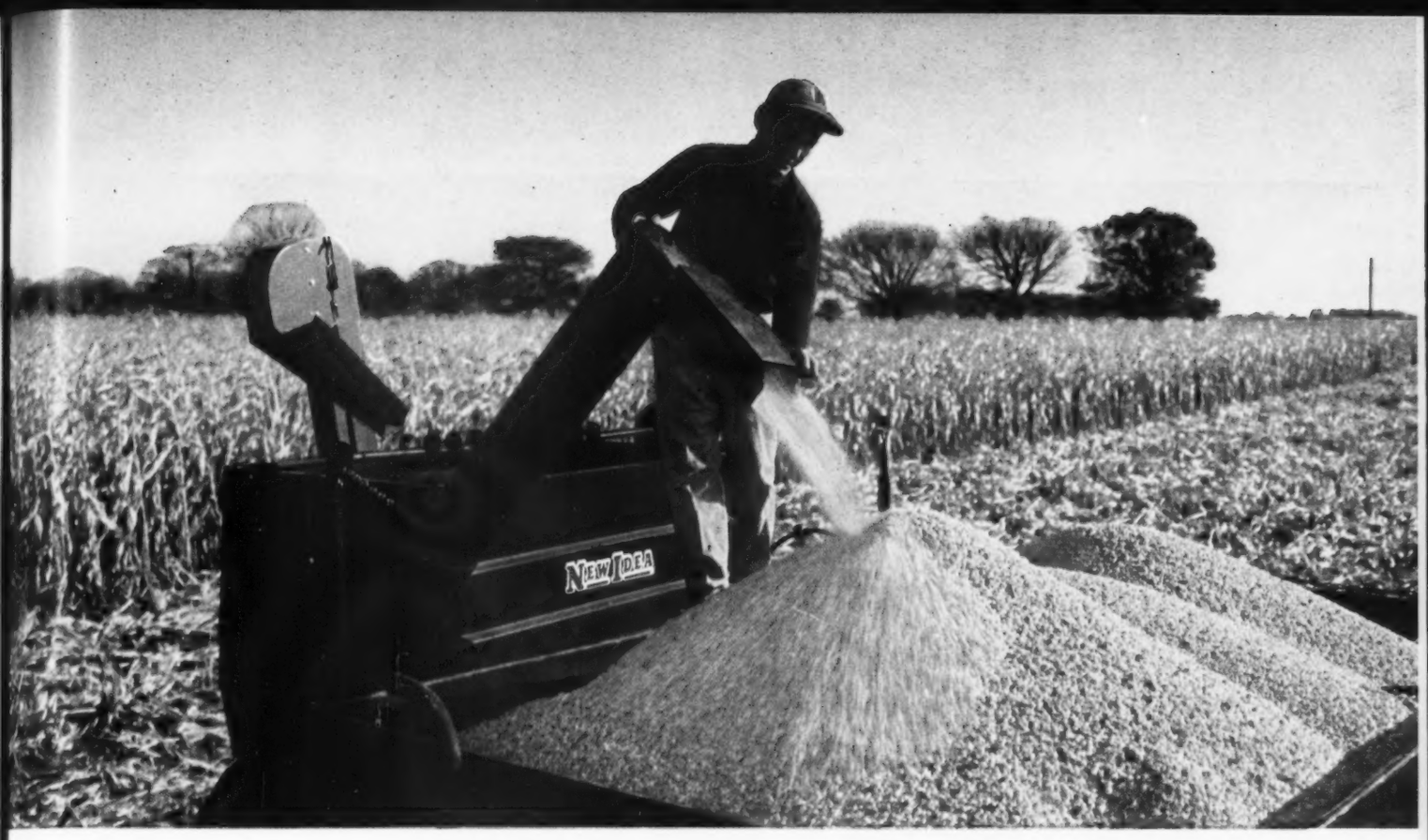


NEW IDEA gives you clean shelled corn straight from the field

Shell quick as you can pick with this high-capacity NEW IDEA field shelling unit . . . Handles the toughest, heaviest stands where lighter shellers fail.

Cash in on profitable shelled corn harvesting with this ruggedly-built NEW IDEA. Harvest your crop earlier. Handle it more economically. Store it in 50% less space. Or, sell it for highest market prices.

NEW IDEA sheller teams with NEW IDEA mounted picker or snapper gathering unit. Shells with gentle action, yet there are no delicate mechanisms that might be damaged by cobs and pieces of heavy stalks.

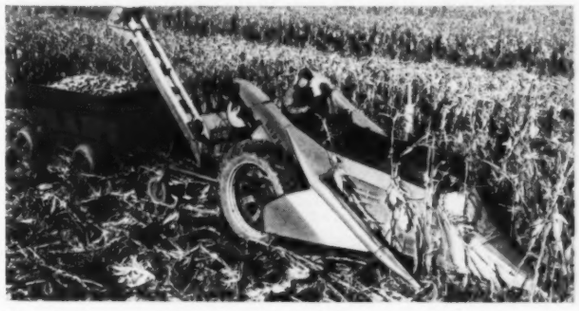
Easy 30-minute, one-man changeover lets you harvest ear corn or shelled corn, either or both the same day.

Sheller feeds clean shelled corn into built-in, power unloading grain bin with leveling auger (as shown above), or available without grain bin for loading into trailing wagon (as shown below).

Sealed-for-life ball bearings make lubrication easy. Only 5 daily and 8 periodical grease fittings on grain bin model. Only 3 daily and 7 periodical fittings without bin.

See the NEW IDEA picker-sheller now at your NEW IDEA dealer's. Or mail coupon today for free literature.

PTO-operated NEW IDEA sheller hugs gathering unit of NEW IDEA picker or snapper for easy maneuverability. To change from ear corn to shelled corn, simply remove trailing husking unit and attach sheller. Change either way by yourself in less than 30 minutes.



NEW IDEA mounted picker picks cleanest . . . husks cleanest . . . gets more down corn. NEW IDEA's high-capacity trailing husking unit puts less weight on tractor wheels . . . permits operation in soft fields. Husking bed has largest capacity of any mounted picker.

NEW IDEA
FARM EQUIPMENT CO.
DIVISION *Avco* DISTRIBUTING CORP.
Dept. 78, Coldwater, Ohio

Please send me the following FREE literature:

- ☐ Field Sheller
- ☐ 2-Row Mounted Picker
- ☐ 2-Row Pull-Type Picker
- ☐ 1-Row Pull-Type Picker
- ☐ 2-Row Mounted Snapper
- ☐ 1-Row Pull-Type Snapper

OUR 60th YEAR NEW IDEA

Name_____

Address_____

Town_____ State_____

A $50 profit difference you can't see

Two ears of corn grown from different hybrid seed may look almost alike . . . but there can be a big difference in yield. That difference can mean as much as $50.00 in extra profit from each bushel of seed you plant.

In more than 15,000 corn yield tests made by farmers themselves, Genuine Pfister Hybrids have won 8 out of 10 times by an average of more than 9 bushels per acre. Figuring a planting rate of 6 acres per bushel, that's an extra 50 bushels of shelled corn from every bushel of seed planted, as much as $50.00 in extra profits for you.

Remember . . . two hybrids may look alike, they may cost the same, but there *is* a difference. Prove that difference with a yield check on your own farm. See your P-A-G dealer for Genuine Pfister Hybrids!

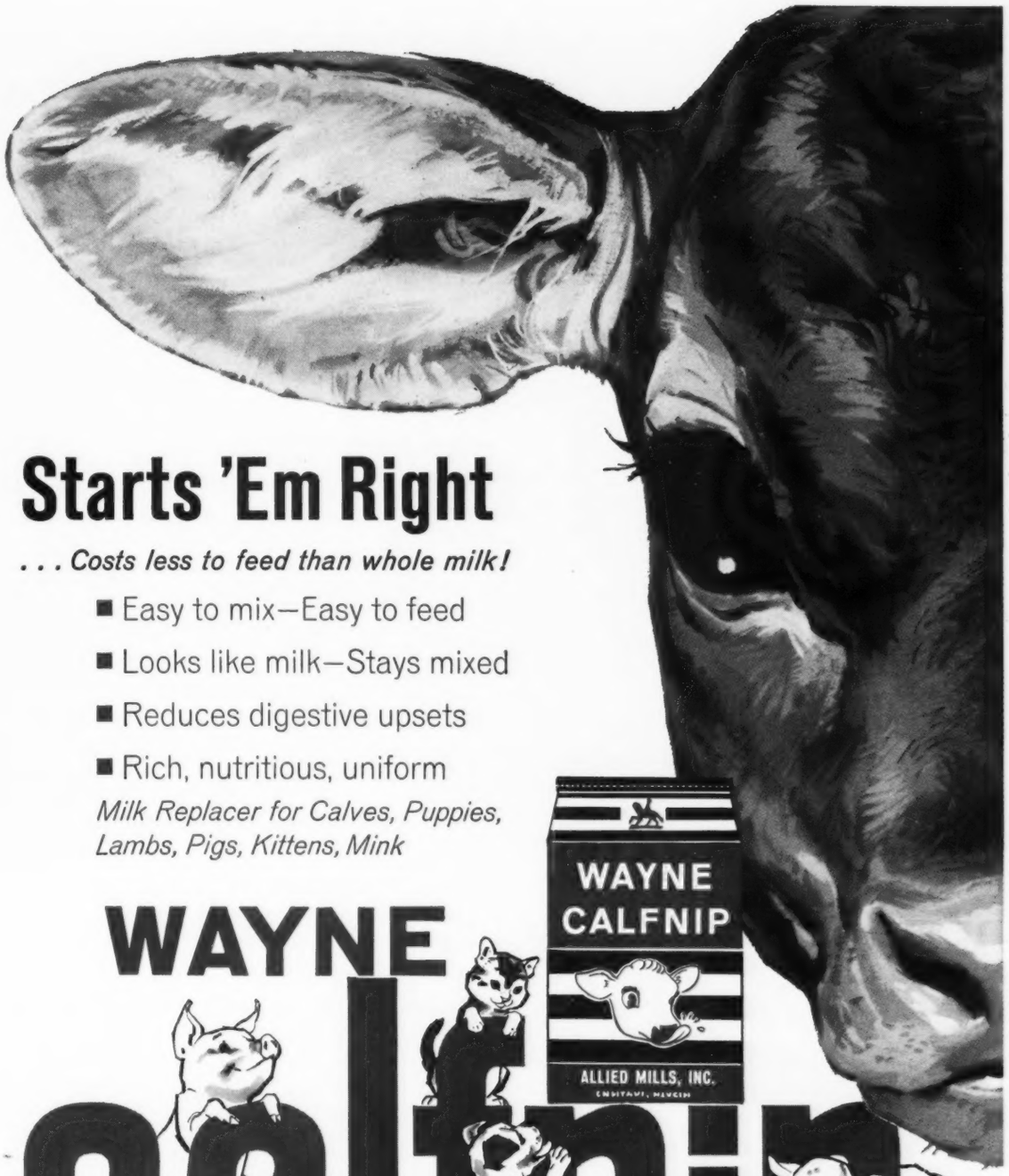
NOW AVAILABLE... P-A-G ALFALFA VARIETIES DEVELOPED TO MEET THE QUALITY STANDARDS THAT HAVE MADE P-A-G **THE MOST FAMOUS NAME IN CORN**

Genuine Pfister P-A-G PFISTER ASSOCIATED GROWERS, INC.

Pfister Associated Growers, Inc.

GENERAL OFFICES, AURORA, ILLINOIS

THE MOST FAMOUS NAME IN CORN



Starts 'Em Right

. . . Costs less to feed than whole milk!

- Easy to mix—Easy to feed
- Looks like milk—Stays mixed
- Reduces digestive upsets
- Rich, nutritious, uniform

Milk Replacer for Calves, Puppies, Lambs, Pigs, Kittens, Mink

WAYNE calfnip

Get WAYNE CALFNIP from your nearby Wayne Feed Dealer

SPECIAL OFFER!
Get this 49¢ value Handy Calfnip Mixer for only 10¢.
Send sales slip or Calf head from Calfnip bag and 10¢ to: Allied Mills, Inc., Dept. M, Fort Wayne 1, Ind.

Offer good only in U.S. Void where prohibited, taxed or otherwise restricted by law.

Your Name_____

Address_____

Just $33 a month puts a New Holland Model 33 Crop-Chopper to work in your pasture, after a small down payment or trade. Ask your New Holland dealer about this new finance plan.

Chopped clean–*twice*...it's a real DIVIDEND FOR LIVESTOCK!

READY TO SHRED IN A MINUTE. Just flip open the auger housing door and you're ready to shred corn and cotton stalks, orchard prunings, grain stubble . . . just a few of the many work-speeding uses you'll find for the versatile, low-cost "33" Crop-Chopper!

Feel it. Smell it. Fresh, fragrant, nutrient-rich sorghum silage. Clean-cut by a New Holland Crop-Chopper.

Valuable feed, ready for your silo. Standing crop or down, you get it all with the fast, amazingly versatile Model 33. Exclusive Curvo-Thrust Cutterhead double-chops, clean-chops with its recutting knives. Gives extra lift in the spout with its cupped paddles. Your "33" Crop-Chopper delivers to side or rear with equal ease. And it pays off its low first cost in short order because it does so *many* jobs around your farm . . . all year long.

For an economical combination, team your "33" with a New Holland Spreader with Forage Sides and Cross Conveyor. Saves labor, saves on initial costs, too.

See the Crop-Chopper today at your New Holland dealer. Or write New Holland Machine Company Division of Sperry Rand Corporation, New Holland, Pennsylvania.

NH NEW HOLLAND
"First in Grassland Farming"

New lightweight PIONEER CHAIN SAW handles any farm cutting job!

The all-new PIONEER "400" will cut your firewood, fence posts, brush, dock stakes or what-have-you with an ease that's hard to believe! This surprising chain saw trims and limbs orchard or ornamental trees quickly . . . tackles a thousand tough farm and wood-lot cutting jobs . . . accomplishes them with minimum effort.

Here at last is a truly lightweight chain saw that makes sense. Weighs only twenty pounds . . . shaped and balanced to handle with utmost ease. Yet the new "400" is tough . . . packs the lugging power to double as a production chain saw for farmer-loggers who harvest annual tree crops.

But seeing is believing! Prove to yourself how this powerful, tremendously versatile new chain saw will fit your operation. Call your PIONEER dealer now for a free demonstration.

FREE ILLUSTRATED BOOK

"How to Make Dollars and Sense with Your PIONEER Chain Saw." Write for free copy today!

PIONEER SAWS

DIVISION OUTBOARD MARINE CORPORATION
Department PFQ-99, Waukegan, Illinois

The Farm QUARTERLY

Autumn, 1959, Vol. 14, No. 3

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THE FARM QUARTERLY

22 East Twelfth Street, Cincinnati 10, Ohio

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Farm Quarterly is published Spring, Summer, Autumn and Winter. Price 50c a copy; $2.00 a year. $3.50 two years, $5.00 three years. Add $1 per year for countries outside USA and Canada. Send check to Farm Quarterly, 22 East 12th Street, Cincinnati 10, Ohio.

Winter issue on sale Dec. 7 at all Class A newsstands.

Walter Bones, Jr. (left), Paul Smith of the Bob Davis Firestone Dealership, and Lester Inks check a Firestone's long-wearing tread.

"FIRESTONES OUTLAST 'EM ALL ON A RANCH'S ROUGH GOING!"

says Walter Bones, Jr., Bones Hereford Ranch, Parker, South Dakota.

"Heavy-duty is the word for our ranch operation. That's why I always insist on Firestone tires for my trucks and tractors. They're built to last, and they hold up longer than any other tires I've tried. And the Bob Davis Firestone outfit in Sioux Falls gives me fine, fast service."

Farmers all over the country are finding Firestone truck tires save them money! It's only natural, too, because they're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires! And with Firestone S/F (Shock-Fortified) cord, they stand up to the hardest knocks farm tires have to take! And there's a Firestone tire for every farm truck from half-ton pickups to heavyweight haulers. If you want extra low-cost mileage for farm to market runs, buy the famous Firestone Transport tire. And for positive traction in muddy feed lots, on slippery roads or in soft fields, economical Firestone All Traction or Super All Traction tires are your best buy.

See your Firestone Dealer or Store and find out how Firestone truck tires give you extra service at no extra cost! See the complete line of Firestone tractor and implement tires, too. And remember, the Firestone Free New Tractor Tire Loaner Service keeps your tractors working while your Firestone Dealer or Store retreads or repairs your old tractor tires.

CONVENIENT TERMS

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1959, The Firestone Tire & Rubber Company

Why your farm will earn more when one of your tractors RIDES ON TRACKS!

Today's modern farmer needs *at least one* tractor for the jobs wheels can't handle. Sure, you can buy a bigger wheel tractor, but that doesn't solve the problems of slippage, soil packing, working when certain jobs *must* be done, manpower, and the many extra jobs you have around the farm.

Because today's successful farmer-businessman expects so much more, *only* a Cat track-type Tractor can really fill the bill. For here's the tractor you can depend on to pull big loads—it's useful 365 days each year—and mud and snow can't stop it. With it, you can do almost any farm job so much better and more efficiently—pull wider hitches, work more land deeper and faster. You save money in terms of labor and fuel.

Now comes another big *plus:* Good farming practices require earthmoving, land improvement and conservation work such as filling gullies, cutting ditches, land forming, removal of rocks and trees.

You can beautify your home area, build roads and ditches to make your farm more accessible, earn extra money doing custom work, build ponds for pleasure, water supply or flood control.

You can be this kind of a farmer—and for a lot less money than you'd think. Call your Caterpillar Dealer for all the facts and a demonstration! No obligation.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

We'll send you FREE BOOKLET . . .
"Tires or Tracks" . . . to help you evaluate your farm power program. Address: Caterpillar Tractor Co., Dept. FQ9, Peoria, Illinois.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

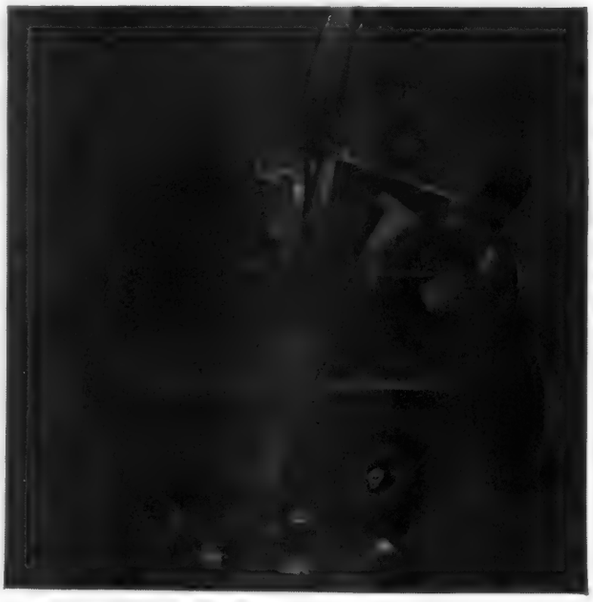
THE FARM IN YOUR FUTURE CALLS FOR TRACKS!

Toughest shredding jobs a breeze for Servis Gyros

Tough, fibrous, heavy, these okra stalks are 3" across, 6' high. The Servis "Gyro" pulverizes them easily, steadily, without a hint of clogging.

Here's why...

Tremendous blade momentum gives cutting power far exceeding simple PTO action. Intermeshing blades chop exceptionally fine. Fan blades, suction skirt, deflector ribs keep stalks in the air.



See it demonstrated by your Servis dealer. Write for his name.

Servis EQUIPMENT CO. DALLAS, TEXAS

Dept. FFQ

Servis Equipment Company
1000 Singleton Blvd.
Dallas, Texas

Please send me information on items checked.

Name_____

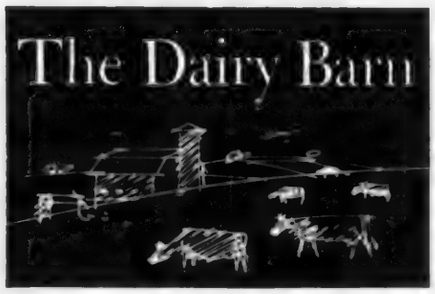
Address_____

City_____ State_____

Type Tractor Owned_____

- ☐ Gyro 84" Brush Cutter (Pull-Type)
- ☐ Gyro 66" Shredder (Pull & Lift models)
- ☐ Gyro 60" Shredder (Pull & lift models)
- ☐ E 60" Clipper (Pull & lift models)
- ☐ BM-60" Mower (Belly mount)
- ☐ Pasture Renovator
- ☐ Whirlwind Terracer
- ☐ Hudson Automatic Row Marker
- ☐ Dump-type Rake
- ☐ Soil Scraper
- ☐ Lone Star Blade (light, 6')
- ☐ 3-Way Ditcher-Terracer Blade, 6'
- ☐ Heavy Duty 3-Way Blade, 7'
- ☐ No. 7 Angledozer (w/Brush Rake at'chmt.) (Row crop tractors)

"Make Pay Dirt Pay More — Join Your Soil Conservation District"



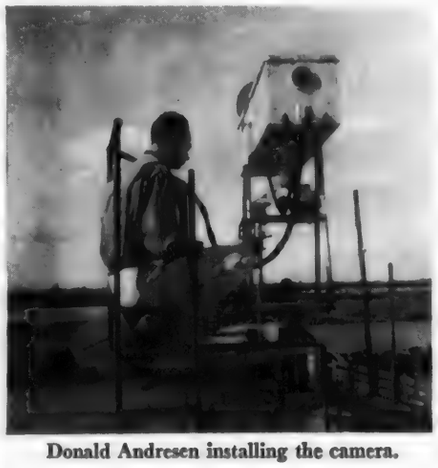
Closed Circuit TV

Donald D. Andresen is more than the son of a Fresno, California, dairy farmer, he's an electronics bug. He's bug enough to have built a closed circuit television unit on their 160-acre dairy farm.

Scouting around, Donald picked up $2,000 worth of TV equipment; surplus camera, used cabinet TV set, and various wires, motors, pipes, conduit, solenoids and fixtures. With wire and ingenuity, Donald Andresen coupled a TV camera atop his father's dairy barn to a picture tube and control cabinet in their living-room.

From the living-room they can see the whole of their farm (not into the barn, as the camera is on its roof), and clearly view the high school two miles away. The picture is as good as commercial TV.

The camera has a 360 degree turn, and can move up and down and focus on any object. All the controls are installed in the farmhouse. The system, new and unfinished (Donald is now in Europe on an educational tour) already incorporates a talk-each-way intercom between barn and house, and later may permit talking to anywhere on the farm. He hopes to rig lights so the unit can work at night. The unit is weather-protected, including a safety solenoid devised by Donald, to close when heat or bad weather threatens to damage the delicate camera, inside its fiberglass shell.



Donald Andresen installing the camera.

Donald graduates from college this February (without having taken one course in electronics) and hopes to do some graduate work in electrical subjects. The college at Davis encouraged him. They feel he could handle the theory—he's had the practical experience.

"My DARI-KOOL Lets Me Sleep An Hour Longer In The Morning!"

MR. LEON WOHLFERT, R1, Eagle, Michigan, writes as follows:

"I had a 200 gallon direct-expansion bulk tank and traded it for a 300 gallon Dari-Kool. I now ship about 2000 pounds of milk every day, or about 500 pounds per milking. I milk with three units and it takes just about one hour.

I bought the Dari-Kool because I needed a larger tank and I needed faster cooling. *Now, I can sleep an hour longer in the morning.* Now, my milk is always ready to go when I finish milking at 8:30. Before, I had to finish milking by 7:30 to have the milk under 40° by the time the hauler came."

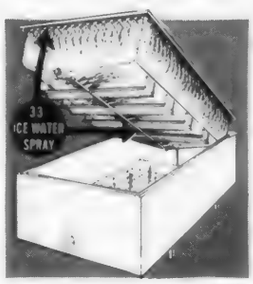
Leon Wohlfert

Comparison of Milk Temperatures at the Finish of Each Milking Period

Mr. Wohlfert submitted these figures which show the superior cooling of his new Dari-Kool as compared to the direct-expansion tank he formerly owned. The temperature readings were taken at the finish of each milking. The direct-expansion readings were taken during the last week he used that tank. The Dari-Kool readings were taken during the first week he used his new Dari-Kool.

	DIRECT-EXPANSION	DARI-KOOL
FIRST MILKING	60°	45°
SECOND MILKING	55°	43°
THIRD MILKING	50°	42°
FOURTH MILKING	45°	39°

NEW DARI-KOOLS COOL MILK FASTER THAN ANY OTHER COOLER — *and here's the reason why!*



33° ice-water is pressure sprayed over all 4 sides and the entire bottom of the milk tank. Milk heat is removed faster than is possible with any other cooler or method. The milk cannot be damaged by freezing. Dari-Kool's faster cooling assures lowest blend temperatures — higher quality milk.

A recent nation-wide bulk tank survey conducted by a leading farm magazine shows that Dari-Kool not only leads in sales but is preferred 3 to 1 over the next leading brand. Your Dari-Kool dealer has a copy of this survey. Ask to see it.

Shown above, new low-design 400 gallon Dari-Kool. Also available in capacities from 100 to 1250 gallons.

The Largest-Selling Cooler In The World!

MEETS ALL 3A STANDARDS

DARI-KOOL
BULK MILK COOLER

Write Dept. 83 today for your
FREE Milkhouse Plan Kit
DAIRY EQUIPMENT COMPANY
MADISON, WISCONSIN
Manufacturers of KARI-KOOL Truck Tanks

"WORK STOPPAGES ENDED

with my Eaton 2-Speed Axle,"... SAYS FARMER MARVIN JOHNSON, MADELIA, MINN.

"My 300-acre farm is completely mechanized," says Mr. Johnson. "And I use my truck – an International equipped with an Eaton 2-Speed Axle – more than any other piece of equipment on the place. Before I switched to Eaton, last year, I had plenty of problems. My former truck equipped with a conventional axle couldn't go slow enough to keep pace with my combine during grain harvests. It would jerk and stall, forcing the combine to stop. Now, with Eaton's low-gear range, I get a slow, steady pull that eliminates these costly stoppages.

"The Eaton also makes my feed-hauling operation more efficient. I take grain into town for grinding at the mill, then bring the ground grain back to the farm as livestock feed. With the conventional axle, it was difficult to drive into feed lots under muddy conditions. Now, Eaton's low-gear range gives me the extra pulling power I need to move in and out of feed lots, no matter how soft the ground.

"Hauling produce to market is faster, easier and less expensive with an Eaton 2-Speed Axle. Eaton's high-gear range enables me to maintain top legal speeds at low engine RPM, even with capacity loads. Push-button shifting makes the Eaton easier to handle. So easy, in fact, that my wife often does the driving. It's more economical, too. My annual gas expenditures are down 10% since I switched to Eaton."

Discover the advantages of an Eaton 2-Speed Axle for yourself. Ask your truck dealer for a demonstration today.

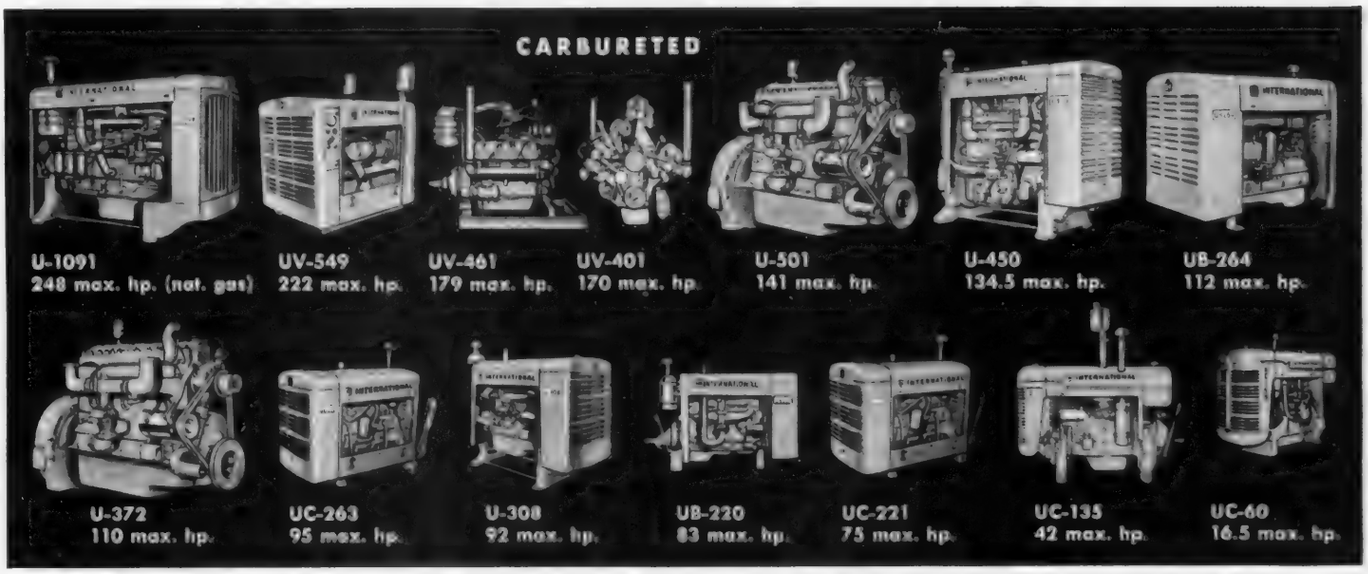
"MAINTENANCE COSTS ARE LESS with an Eaton 2-Speed Axle," says Mr. Johnson. "With the conventional axle, I had to 'baby' the truck to keep maintenance costs from eating up profits. But the Eaton 2-Speed is much easier on the motor and transmission. Since I switched to Eaton, my repair costs have been practically nothing."

INTERNATIONAL HARVESTER DEALER George Allen, Madelia, Minnesota, says, "My customers report complete satisfaction with the Eaton 2-Speed Axle and say they will never go back to a conventional axle. I recommend Eaton every time for its versatility and economy. Another point I make is that an Eaton-equipped truck has a considerably higher trade-in value than a truck equipped with a conventional axle."

MORE THAN 2 MILLION
EATON AXLES IN TRUCKS TODAY

EATON 2-SPEED TRUCK AXLES

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO



Get set for '60 irrigation with *fastest payback power!*

These 24 heavy-duty International engines—fastest payback power you can put on your irrigation pumps—will help you get set for the '60 pumping season by lowering water costs and giving you the most dependable crop protection your money can buy.

When you choose dependable International power, you get most favorable water rates with these savings: 1) pump-matched power—no underpowering or overpowering—with 24 well-spaced models; 2) lower fuel costs with factory-engineered equipment to burn the least costly fuel available; and 3) lower maintenance costs with heavy-duty International engines that farmers and ranchers have always found cost less to own and operate.

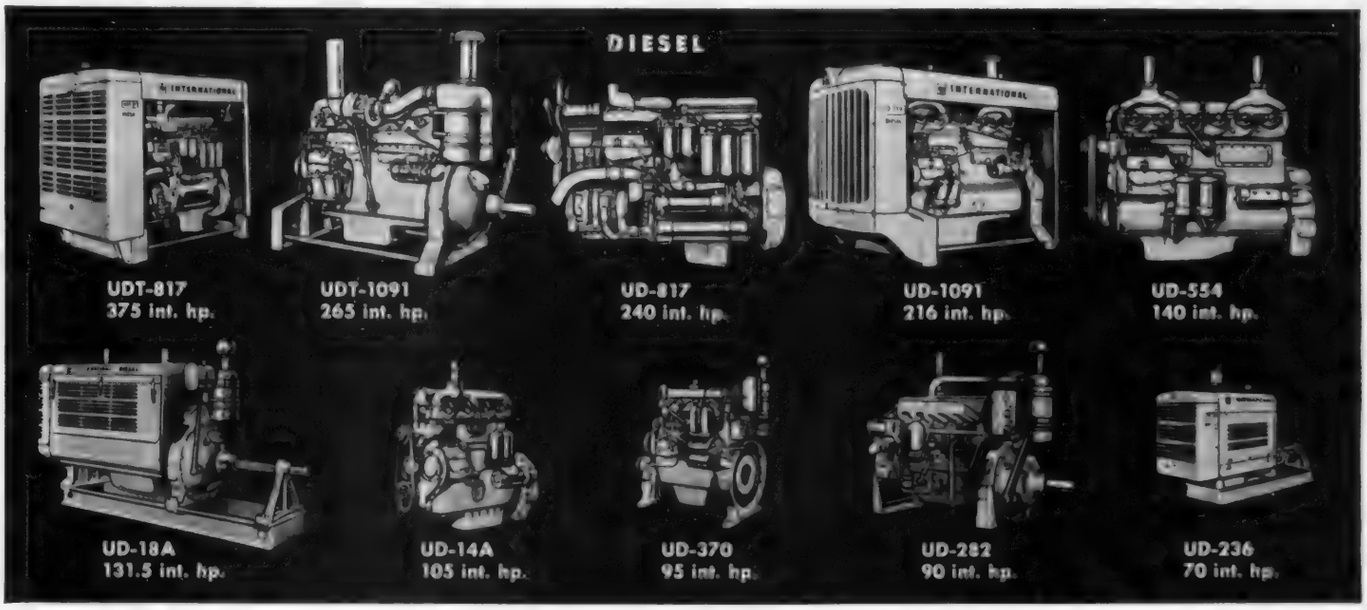
There's power here for every type system—sprinkler or flood—and from 16.5 to 385 max. hp. You buy just what you need for your installation. All models are available from stripped engines to complete power units.

It costs you only a few minutes time to get full details on any model from your International Power Unit Distributor or Dealer—the man who sells and services fastest payback power.

International® *Construction Equipment*

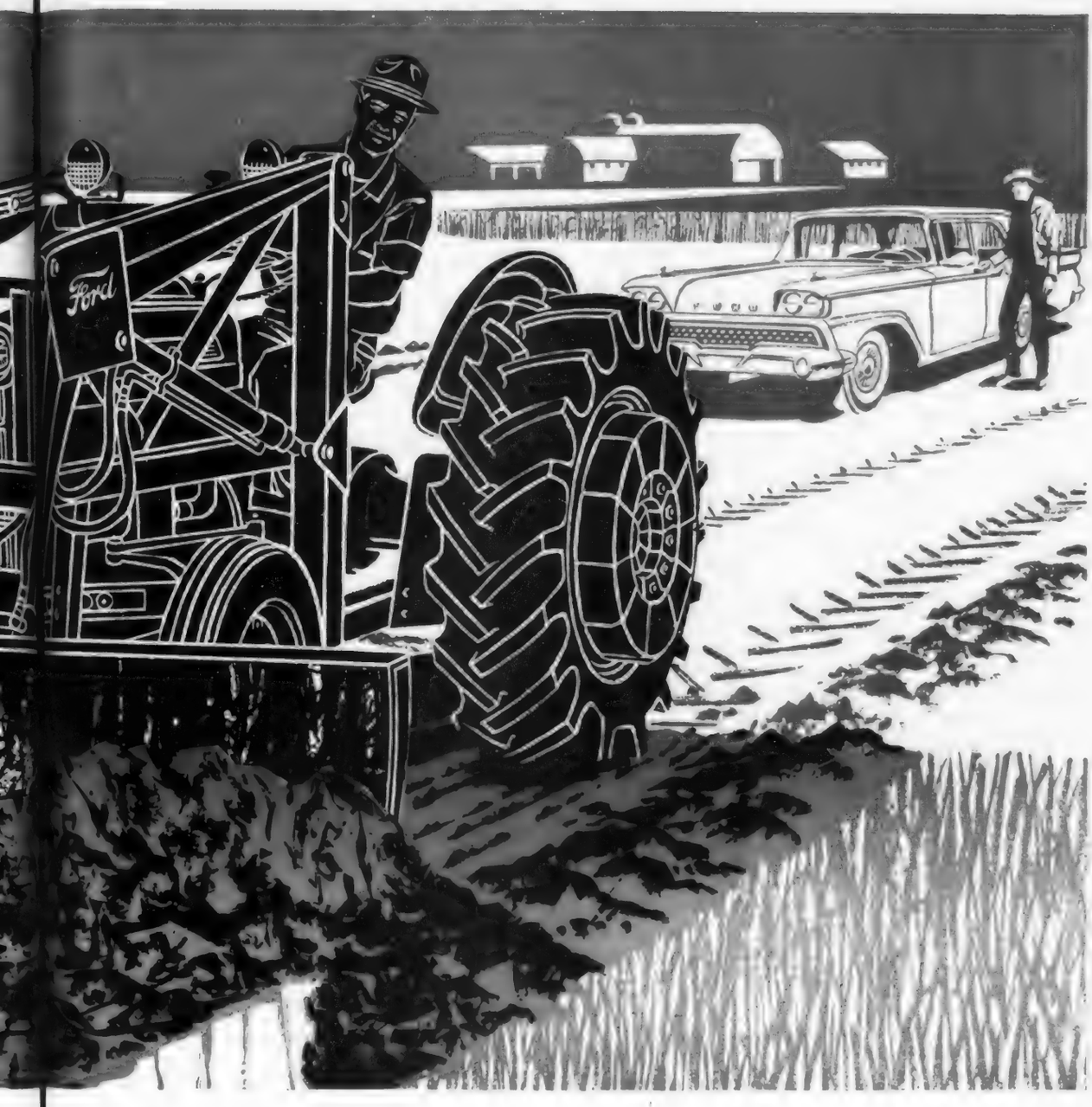
International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.



703 Extra Heavy-Duty Loader with Dozer Blade on 861 Ford Tractor; C-750 Tilt Cab Truck and Ford Custom 300 2-door Sedan

Husky "farm hand" with muscles of steel



Ton-size chores are getting lighter every day thanks to Ford Power Farming. For example, take this rugged rig. It really gives busy farmers a lift. Mountable on any Ford all-purpose tractor, it's the Ford "703" extra heavy-duty loader with dozer blade—new member of the Ford Farm Family. Just name the lifting, leveling or loading job and the "703" will cut it down to size—and cut costs, too.

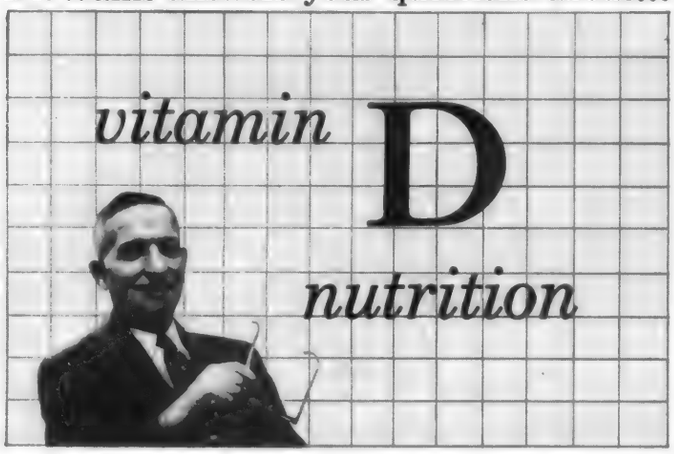
The "703," of course, is typical of hundreds of work-easing, money-saving ideas that are putting Ford on a "first-name" basis with progressive farmers the countryside over. From cars to trucks, every fine Ford product is engineered to lighten your load and brighten your leisure.

There's still more you will want to know about raising profits and crops the Ford Power Farming way and your local Ford Motor Company dealer will be glad to explain. Let him show you how a Ford investment can send production *up* and keep costs *down* on the farm.

FORD MOTOR COMPANY THE AMERICAN ROAD, DEARBORN, MICHIGAN

THE FORD FARM FAMILY: TRUCKS • TRACTORS • IMPLEMENTS • CARS • INDUSTRIAL ENGINES

Dr. Wallis answers your questions about...



q: Is there a new recommendation for the amount of vitamin D to be fed for preventing milk fever?

a: Yes, on the basis of recent work, the Ohio Agricultural Experiment Station now recommends 20,000,000 units of vitamin D_3 per day for five to seven days before freshening. This is two-thirds of the previous recommendation. Now milk fever prevention costs even less than before.

q: Can I depend upon good sun-cured hay to supply enough vitamin D for my livestock?

a: Definitely not. Contrary to what is often assumed, the amount of sunshine received in curing does not provide a reliable basis for judging vitamin D content. Some sun-cured hay is even lower in vitamin D than artificially dried hay.

q: I have a herd of good producing dairy cows. How much vitamin D do they need?

a: Experimental evidence on vitamin D requirements is limited to work for less than a year on five or six cows in moderate to low milk production. Obviously, this is not enough to give reliable information for high-level performance on a long time basis. Based on accumulating evidence on vitamin D needs, more feed manufacturers are increasing fortification of complete dairy rations to 6,000 - 8,000 units of vitamin D per pound. As an example, when fed at the rate of 10 pounds per day, a cow would get 60,000 - 80,000 units of vitamin D daily.

q: My brood sows are getting a lot of sun-cured alfalfa hay. Will that take care of their vitamin D needs?

a: Not necessarily. One-third of twelve sun-cured alfalfa hay samples included in a recent report would have contributed less than 60 units per pound of complete brood sow ration when used at a level of 25% and the lowest one only 20 units. The highest one of the twelve samples would have contributed far less than the 500 units per pound recommended by many nutrition authorities. (Send for free reprint "The Vitamin D Content of Roughages").

q: Will it do any good to put vitamin D into beef cattle rations?

a: Very little controlled research has been done, but benefits from supplemental vitamin D have been observed in college and commercial beef herds for growing, fattening, and breeding stock. Realizing that unrecognized losses may frequently occur, many feed manufacturers fortify beef cattle rations with vitamin D.

G. C. Wallis

Send your questions about vitamin D nutrition to Dr. G. C. Wallis, Director of Nutrition, Agricultural Department, Standard Brands Incorporated, 625 Madison Avenue, New York 22, N. Y.

Fleischmann's Fidy Irradiated Dry Yeast
rich in vitamin D for four-footed animals

another fine product of

Standard Brands Incorporated

LETTERS

The Dilemma

Sirs:

I wish to commend you for your excellent article, "The Agricultural Dilemma." Your analysis in terms of alternatives (or some combination thereof) should help some people to see how complicated the farm problem really is.

You really made it clear that there is no easy and painless solution.

George P. Deyoe

Champaign, Illinois

Sirs:

I would like to point out something that was not mentioned in your article on the farm problem. There is *not* a surplus of good quality milling wheat. Western Kansas wheat does not go into storage. We receive 5 to 10 cents a bushel over Kansas City prices here all the time.

Eastern and southern farmers raising 15 acres of wheat that are not in the commercial wheat area are the ones that are causing the surplus in wheat. This wheat is soft wheat. Millers don't want it, so it goes into government loan and Mr. Benson calls it a surplus.

All this is bad enough but the 15-acre farmers go on forever while our allotments are cut more and more all the time.

Wayne Gattshall

Goodland, Kansas

That Wonderful Jim

Sirs:

Reference is made to the article "Jim, the Wonder Dog of Sedalia."

It was in the summer of 1940 that I had to spend a night in Edinburg, a small country town in southern Texas. It was Saturday night, and the stores were open with the farm people in the town doing their shopping. To spend the time, and to see the people in action, my wife and I strolled into the business section. We noted a group of people circled around some one on one of the streets. This group was quite orderly and attentive. We joined them to see what was going on. In the midst was a man and a dog. I do not know what kind of dog it was. So far as I recognized it was just a dog. The man was giving him orders and he was performing very much as Jim performed. I, of course, thought it a trick and that there were people in the group who were part of the show. I soon convinced myself that he was really dealing with men who were strange to him. I watched the performance for some time trying to see through the trick, but finally gave up and returned to the hotel.

Many times since that night, the incident has returned to my mind, but I have always dismissed it as some trick that I was not clever enough to see through. Then came your article.

I write this thinking that others, reading your article, may have had experiences similar to mine and will write to tell about them. There is some explanation somewhere.

Richard H. Eanes
Col., U.S.A., Ret.

4515 Connecticut Ave., N. W.
Washington 8, D. C.

City Know-How

Sirs:

We brag about one farmer feeding 20 city people, but frankly these figures scare me. It means to me that only 1 in 20 voters and 1 in 20 congressmen understand a farmer's problems. Just to show you how far city people have drifted from the farm—we had some kids on our place last Sunday. One of them asked me if our horse had shoes on. I said, "No. We only use him around the farm and he doesn't need any." The boy looked and looked at the horse and finally said, "Well, if he doesn't wear shoes, what are those wooden things at the end of his legs?" My wife and I laughed about this at the time, but it scares me to think of the growing isolation of the farmer in a population which doesn't understand him.

George Groesbeck

Springdale, Illinois

Solid, Man!

Sirs:

Enjoyed your story on solid irrigation. Particularly the girl sitting on the pump. What is her name?

William McClure

Vancouver, Canada

Ans. Barbara Baker and she is our candidate for Miss California of about 1965.

Your Doctor of Motors says...

"TRY THESE PROFESSIONAL TIPS ON ENGINE BREAK-IN!"

To keep performance high and repair bills low, you're always wise to follow modern break-in procedures. This will assure adequate lubrication of pistons, cylinder walls, bearings and other moving parts and prevent excessive initial wear.

So whether you're sporting a new tractor, truck or car, or have overhauled the old one, you'll be time and money ahead if you follow a few professional tips on engine break-in:

1. Avoid the out-dated method of breaking-in by idling for long periods. Cold water running through the block at idling speeds keeps the cylinders contracted while the pistons are expanding—causes pistons and cylinder walls to scuff and score.

2. Make the first job one where you can vary the engine speed frequently for the first 2 or 3 hours. Acceleration loads the rings sufficiently for quick mating of cylinder and ring surfaces. Deceleration causes a high vacuum to form in the cylinders so that oil is drawn into the upper cylinder area to cool and lubricate both cylinder and rings. Also, changing engine speeds lets the coolant reduce the temperature of any hot areas before damage takes place.

3. Make sure the weight of oil is what the manufacturer recommends. Watch oil pressure and temperature gauges closely during the first few hours—and be sure the filter is clean.

4. Change engine oil and oil filter after the first 10 hours (or 500 miles). This removes particles of metal which come loose from new surfaces being worn-in.

5. Avoid low engine speeds under full power. This lugging causes overheating through too much fuel charge, inadequate oil and water circulation. This can damage piston and cylinder walls, wrist-pins, rod bearings, even the transmission and differential.

Next to engine care and protection, nothing adds more to engine life than Perfect Circle 2-in-1 Chrome piston ring sets. PC *solid* chrome plating resists scuffing and scoring, provides 200 extra degrees of temperature safety margin, doubles the wear-life of pistons, cylinder walls and rings!

PERFECT CIRCLE

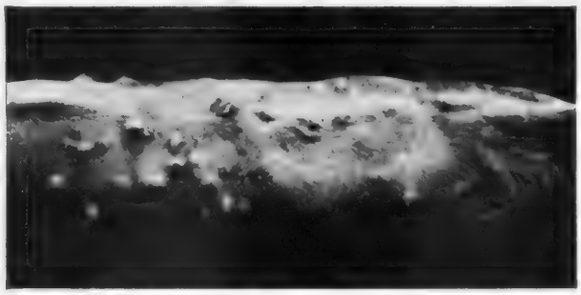
Hagerstown, Indiana Don Mills, Ontario, Canada

Here's the Proven Spray Way to have Grub-Free Cattle!

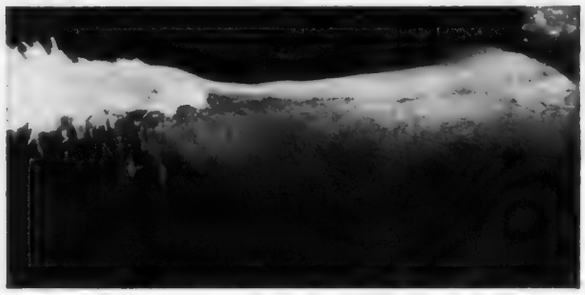
Co-Ral*

25% WETTABLE POWDER

LIVESTOCK INSECTICIDE



UNTREATED Grubs in back of untreated animal are a familiar sight to ranchers. Grubby animals will bring lower prices because of damaged meat and hides and reduced weight gains.



TREATED Photo of grub-free animal sprayed once with Co-Ral just after end of heelfly season. Healthy full-weight animals will bring top prices, thanks to single Co-Ral spray treatment.

Such dramatic proof of the remarkable effectiveness of Co-Ral is not unusual! This year thousands of cattlemen have reaped the benefits of Co-Ral treatment last fall. They sent healthier, heavier, higher grade beef to market . . . and they made more profit per head.

The time to kill grubs is inside the animal—before they can damage meat or hide. And that's where and when Co-Ral does its work. A single spray treatment with Co-Ral, right after the heelfly season, not only kills grubs but kills lice and ticks and gives extended protection against horn flies and screw-worms. And, being a spray, Co-Ral is easy to use . . . saves handling and labor. No other chemical provides such complete and effective control of all major livestock insect pests.

So, plan now to use Co-Ral for grub-free cattle. Have healthier herds, higher grade beef and hides, better weight gains and make more profit per head.

Now Available through Dealers in Agricultural Chemicals!

A PRODUCT OF

CHEMAGRO

"Chemicals for Agriculture—Exclusively!"

**Trademark. Researched as Bayer 21/199*

"My Armco grain storage and drying building helped save my milo crop"

D. W. Jungclaus, Crofton, Nebraska, reports, "Many Nebraska farmers lost their crop because of early fall rains (1957). But because I had just completed my Armco Drying and Storage Building, I was able to get most of my crop in before the rains hit. I didn't have to wait for the grain to dry before harvesting. When marketed, my crop was graded No. 1 and had good color. There was no spoilage."

There are good reasons why Mr. Jungclaus and other modern farmers are building grain storage the Armco way. Strong, tight panel-walls of Armco Grain Storage Buildings are simple, easy to erect and low-cost. Grain is piled directly against these sturdy walls. No ties into the floor are needed in most sizes. Interlocking joints keep out weather and pests. Just as important, your Armco Grain Storage Building can work year-round. When empty of grain, it "doubles" as efficient machinery storage or for other uses.

STEELOX® roof and wall panels are made of heavy 22-gage and 20-gage steel—corrosion-protected by tightly bonded zinc or aluminum coatings. They won't rot, crack, warp or burn. Maintenance is practically eliminated.

If you're looking for a grain storage building that will work for you every day of the year—and last a long, long time *after* it's paid its way—just send the coupon. Capacities start at 3800 bushels. For smaller storages, Armco Grain Bins are available.

Armco Drainage & Metal Products, Inc.
389 Curtis Street, Middletown, Ohio

Send details about Armco Grain Storage Buildings. Capacity needed_____

New steels are born at Armco

Name_____

Street or Box Number_____

Post Office_____

State_____

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

How to wean more pigs per sow

Perhaps the biggest profit news in years for hog raisers is shown by results recently obtained with the use of AUREOMYCIN® in farrowing and lactation feeds for sows.

Seven experimental trials were held on 7 different farms in Iowa. 88 sows and their litters were involved in the trials.

One half of these sows received no AUREOMYCIN at any time. The other half received gestation feeds containing 200 grams of AUREOMYCIN per ton for 7 to 10 days before and 7 days after farrowing. Then, these sows were placed on lactation feeds containing 50 grams of AUREOMYCIN per ton until the pigs were weaned at 8 weeks.

Results showed 7% more pigs weaned from sows fed AUREOMYCIN! This averages out to 7 more pigs per 12 sows. That's an *extra litter* and a significant profit picture for any hog raiser!

Cost of feeding AUREOMYCIN to 12 sows was approximately $26 for the entire feeding period. Sales value of the 7 extra pigs sold as feeders was $105. This resulted in a net extra return of $79. On the basis of two farrowings per year, this means an extra yearly return of $158.

Talk to your feed manufacturer or feed dealer. Ask him about farrowing and lactation feeds containing AUREOMYCIN. American Cyanamid Company, Agricultural Division, New York 20, New York.

CYANAMID

AUREOMYCIN
IN FORMULA FEEDS

®AUREOMYCIN is American Cyanamid Company's trademark for chlortetracycline.

Destination Anywhere...

... and PIPER puts you there with speed, style and safety

Wherever you're heading — to town for shopping . . . back to school with the youngsters . . . a state or two away to an auction . . . to far away holiday places — you'll get there easily, safely . . . with surprising economy . . . in your Piper.

From sturdy utility two-seater Super Cub to luxurious twin-engine Apache, the Piper line fills every type of farm and ranch requirement.

Consider the sleek, three-mile-a-minute Comanche flown by this carefree farm family. Styled like a jet, but as easy to fly as a Cub, the Comanche takes off in only 250 yards. Its rugged retractable tricycle landing gear makes any flat strip a proper runway. Like the Piper Tri-Pacer and Apache, the Comanche can now be ordered with Piper AutoControl, the sensational new automatic flight device that is the last word in flying ease.

Flying farmers and ranchers the world over are doing business more profitably . . . extending their pleasure horizons . . . in super-reliable planes built by Piper. The complete new line of Piper planes includes many advanced features that will interest you—whether you already own an airplane or have yet to discover the advantages a plane will offer you.

Why not send today for details of these Piper planes?

THERE'S A PIPER PLANE FOR EVERY FARM AND RANCH PURPOSE

SUPER CUB. Workhorse for farm and ranch chores. Takes off, lands in 50 yards. Carries two in tandem seats, cruises 110 mph. PA-18-A agricultural model is world's most widely used plane for dusting, spraying.

APACHE. Most widely purchased twin-engine plane. Carries 4 or 5 passengers over 170 mph in roomy luxury. Provides safe, dependable night and day transportation. Has excellent short field and single engine performance.

TRI-PACER. World's most popular four-passenger plane. Combines most features to simplify flying. Cruises over 130 mph, has range over 500 miles, can carry 600 lbs. of freight. Ideal as farm plane.

YOUR "BUILT-IN" AIRPORT

Your Piper is just as convenient as your car, since any level pasture or strip — 100 to 200 feet wide, 1,500 to 2,000 feet long with clear approaches — provides adequate landing facilities.

LEARNING TO FLY IS EASY

You'll find learning to fly easy, whether you take individual lessons from your Piper dealer by the hour or follow Piper's "Learn as You Travel" program. Your Piper dealer will teach you to fly FREE in your own Piper.

COMANCHE. New, high-performance, roomy, four-passenger, all metal plane with retractable tricycle landing gear and many advanced aerodynamic features. Available with 180 or 250 horsepower.

PIPER AIRCRAFT CORPORATION
Lock Haven, Pennsylvania

Please send me literature on:

- ☐ Piper Apache
- ☐ Piper Tri-Pacer
- ☐ Piper AutoControl
- ☐ All Piper models
- ☐ Piper Comanche
- ☐ Piper Super Cub
- ☐ "Learn to Fly" Programs

Name_____

Address_____

Q-4 MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

Meet McCulloch's New **NUMBER ONE** Saws

STARTS RIGHT NOW!

Torture Tests Prove It!

When you pull the starter rope on a new McCulloch *Number One* chain saw — be ready for action right now!

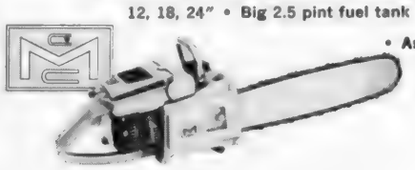
The small inset photograph shows how McCulloch *Number One* chain saws are torture-tested for dependable starting. Hour after hour, day after day, the saws are started, accelerated, stopped . . . started, accelerated, stopped. One saw was started 57,329 consecutive times, and it was still as rarin' to go as the first time it was started.

Even more starting tests were conducted in the field by hundreds of farmers and professional woodcutters. The results proved that McCulloch chain saws are *Number One* for fast starting.

Try a new *Number One* chain saw at your McCulloch dealer. Seven models to choose from.

ONE/40 Direct-Drive

Only McCulloch gives you so much saw for so little money:
• Weighs only 18 pounds • Lubri-Mac Automatic Oiling
• Direct-drive for fast, light-touch cutting • 3 bar sizes — 12, 18, 24" • Big 2.5 pint fuel tank • Pintail Chain



• As low as **$154.95**

LEADERSHIP THROUGH CREATIVE ENGINEERING

McCULLOCH CHAIN SAWS

Number One In World Sales

For free booklet write McCulloch Corporation, Los Angeles 45, Calif., Dept. FQ

McCulloch Corporation, Los Angeles 45, Calif. • Marine Products Division (Scott Outboards), Minneapolis, Minn.
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5-90218

This TEAMED-POWER

Cuts...Shells...Shreds...Saves 15% More Corn

It's fantastic—absolutely amazing! That's what farmers are saying about Oliver's revolutionary row-crop header for self-propelled combines. No other row-crop harvester does so much—cuts, shells, shreds the stalks, and saves 15% more of your crop in average years. That's really *practical* TEAMED-POWER.

IT'S A CAPACITY COMBINE with muscles to thresh your whole crop. No snapping rolls are needed—nothing to crush ears and waste grain. All the forage is shredded and spread over the ground. Corn borers are either crushed or die of winter exposure. At the same time, your land is mulched and protected from soil erosion.

ONE HARVESTER brings in all your grain crops—with a cutter bar or pickup for small grain and beans...with row-crop header for corn and sorghum. One machinery investment does all these important jobs—SAVES expense, SAVES time, SAVES storage space. And the switch from one header to the other is a job you can do in two or three hours.

Where else can you find a combination like this? Nowhere but at your Oliver dealer's—this is Oliver's TEAMED-POWER! "Pay-as-You-Produce" financing available.

THE OLIVER CORPORATION
400 W. Madison St., Chicago 6, Illinois

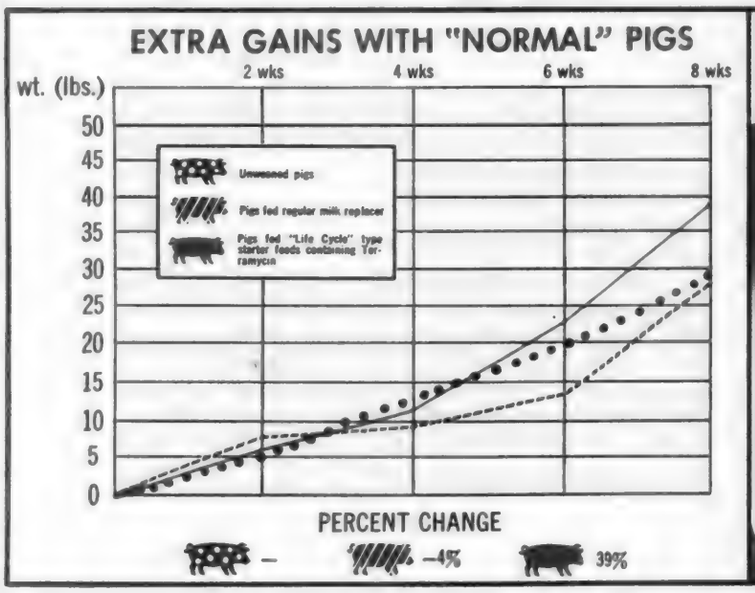
See Your OLIVER DEALER and See

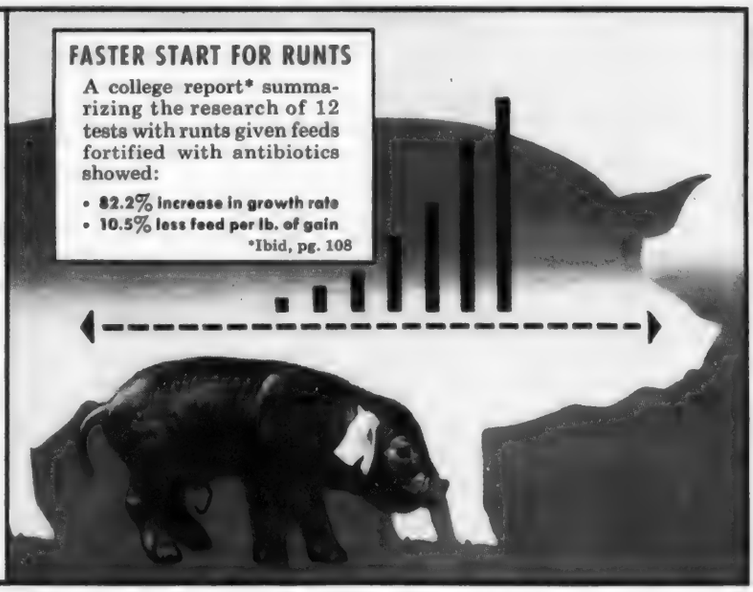
Profit engineered . . . from boar to bacon

LIFE CYCLE FEEDING

Here's how it can help you get 39% heavier pigs at 8 weeks*

(*as reported in: Industrial Application of Antibiotics in Agriculture, Symposium Series No. 2, 10:24:55, pg. 23)




FASTER START FOR RUNTS
A college report* summarizing the research of 12 tests with runts given feeds fortified with antibiotics showed:
• 82.2% increase in growth rate
• 10.5% less feed per lb. of gain
*Ibid, pg. 108

In recent years, swine feeding tests have taught us many lessons. They've taught us how to feed for the critical first few weeks to give pigs a faster-gaining start that carries through to the finishing period.

How is this done? By using your feed manufacturer's program of Life Cycle Feeding. It is a program built around special feeds formulated for the actual needs of pigs during each stage of the life cycle. Here's how it works:

Many swine producers today still wait until their pigs (the ones they have left) reach about 50 lbs. before they start thinking about proper nutrition and feeding a good supplement.

The best that can be said for this type of program is—it's simple! Costly, too!

Consider these facts, well-proven by government, college and feed industry tests. You'll see why the performance of market swine starts in the sow's gestation and lactation period . . . why only with Life Cycle Feeding can you take full advantage of the pig's ability to make a profit for you.

At Farrowing Time: a husky pig weighing 3 lbs. at birth has *five times* the chance of living as one weighing 1½ lbs. (*Life Cycle Feeding and management during the gestation period can help you get consistently large litters by eliminating 90-95% of the causes of variation in litter sizes.*)

The First Week: life itself can be a setback for pigs. The first week is the toughest. (*Litters nursing sows full-fed a modern lactation ration weighed 18% more at the end of the first week in college trials on Life Cycle Feeding.*)

The First 2-3 Weeks: an estimated 10 million pigs in the U. S. don't get enough milk—and are in great need of a supplement. (*With Life Cycle Feeding you eliminate the nutritional guesswork of nursing by having close control over nutrient intake and costs.*)

The heaviest pigs at 8 weeks gain faster on less feed. They also hang up better carcasses than slow-gainers. (*Tests show that with Life Cycle Feeding you can get pigs at 8 weeks that weigh up to 39% more.*)

Add up these facts and you can see why swine nutritionists say proper feeding—using the Life Cycle approach—can take a healthy slice out of the 30% national mortality average for pigs.

How to get Life Cycle Feeding

See your favorite feed supplier soon for complete details. And look for the big Life Cycle Feeding display. It's the sign of a supplier of swine feeds containing Terramycin—for greater protection against disease . . . more powerful help in fighting stress . . . faster gains . . . and fewer runts.

Pfizer

Chas. Pfizer & Co., Inc.
Brooklyn 6, N. Y.
Science for the world's well-being

FOUR MORE BUSHELS AN ACRE!

That's the wagonbox score of small pull-type Model 60 with corn head, in measured field test against big, new self-propelled corn combine

Last fall, in 100-bu. Iowa corn, an old Model 60 ALL-CROP Harvester with 2-row corn head took on a big, new self-propelled combine of another make, also equipped with 2-row corn head . . . same field . . . same day . . . same number of rows . . . exchanging lands halfway through the test to equalize any yield difference.

When the scores were in, the Model 60 totaled: 31.8 more bushels from 7.7 acres . . . in less time, too!

Who but those with experience would have expected the smaller Model 60, veteran of many seasons' grain and seed harvesting, even to hold its own? After all, the big self-propelled was new, twice the size and cost three to four times as much. By coming out ahead, the big little 60 proved size and cost are not true measures of capacity and performance when it comes to field shelling of corn.

Find out how little it will cost you to equip an Allis-Chalmers combine with a corn head for field shelling. Or, consider the low-cost advantages of a used model with new corn head as a permanent unit, leaving your present combine free for other fall crops. See your Allis-Chalmers dealer.

ASK your dealer about the Allis-Chalmers plan to finance your time purchase of farm equipment.

ALL-CROP is an Allis-Chalmers trademark.

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

LISTEN! *National Farm and Home Hour—News—Music—NBC radio*

NEW

light-weight... power-packed

AIR-COOLED DIESELS

for economical farm power

Jlo* Series 365
7 horsepower

Jlo Series 660
12 horsepower

(pronounced "ee-lo")

There's a growing demand for the dependability, economy and safety of diesel engine power for farm applications. Now, for the first time, Hercules offers you the benefits of low-cost, maintenance-free, air-cooled diesel power for applications below 15 horsepower.

Look at the features this new Jlo Series line, available only through Hercules nationwide distributor network, offers:

SIMPLICITY: Jlo Series diesels are of the 2-cycle design, proved practical in their power range. That means there are no valves, tappets, push-rods or camshaft in Jlo engines to require maintenance or adjustment.

EASY TO OPERATE: Jlo Series diesels start fast in all weather; run smoothly too, even under tough, intermittent-load service.

ECONOMY: Low initial cost is coupled with lower maintenance costs, due to the Jlo engine's simple, dependable design. And you save on fuel, too.

PERFORMANCE-PROVED: These West-German built diesels have been successfully used the world over . . . now are available in the U. S. through Hercules, known for dependability and service.

LIGHT WEIGHT: These powerful engines deliver 7 and 12 horsepower yet weigh only 110 and 190 lbs., respectively; add less dead-weight to equipment and save on foundations in stationary applications.

HERCULES

HERCULES ENGINES... Sold and Serviced the World Over

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Hercules Motor Corporation
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Yes, I'd like more information on Jlo Series Diesels for this application.....

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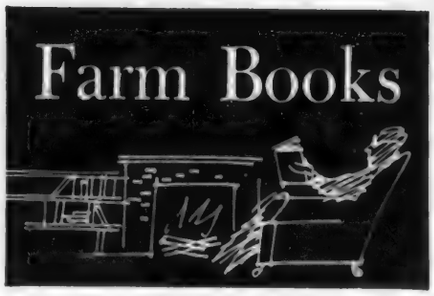


***Dairy Handbook and Dictionary,** by J. H. Frandsen. J. H. Frandsen, Amherst, Massachusetts. $10.50.*

This 800-page tome is a concise summary of most of the commonly discussed dairy subjects. The material is not new, but the 300-page handbook section gives a summary of many useful practical facts (such as in-place-cleaning of pipelines) and should be a handy reference book for the beginning or student dairyman. The larger (500-page) dictionary section gives comprehensive descriptions of many dairy terms, especially cheese and ice cream (Professor Frandsen's specialty) subjects.

The several sections are contributed by authors expert in their fields, and contain good solid information about subjects connected with every phase of dairying.

***The World of Insects,** by Paul Pesson. McGraw-Hill, New York. $15.*

One of the most beautiful books we've seen lately and one of the most interesting is this extravagantly illustrated account of the nature, history and functions of insects. The 52 color photographs are stunning and the more than 200 black-and-white photographs are both spectacular and instructive. Paul Pesson, the author, is Professor of Entomology of the Institut National Agronomique of Paris. His text, which has been translated by R. B. Freeman, is both thorough and interesting—seeming to be directed at the intelligent amateur rather than the student or professional entomologist. We will, for example, never forget his description of the king and queen of an ancient termite colony imprisoned for a hundred years in a mortar cell at the center of the termitarium producing fertile eggs at an unbelievable rate over the decades. Nor will we forget the photographs of the queen with her monstrously over-sized abdomen which illustrated this bit of lore. In addition to writing the texts for this book, Professor Pesson took many of the photographs. If one should know one's enemy, this is certainly an enjoyable way to do it.

New Editions

Tree Maintenance by P. P. Pirone; Oxford University Press, $10. In this third edition, Dr. Pirone covers the care and protection of shade and ornamental trees, and their disease and pest problems.

Production of Field Crops by T. K. Wolfe and M. S. Kipps, McGraw-Hill, $8.50. The growing of grain and forage crops, along with a short section on root crops and some miscellaneous field crops, is brought up to date in this fifth edition.

CHORE-BOY FIRST with a Complete, One-Man Milk Production Package—

Now FIRST with a Complete, One-Man Pork Production Plant

As a result of new ideas and equipment developed by Chore-Boy, during the past five years, many dairymen are producing more milk, of better quality and at less cost than they ever did before. First, Chore-Boy developed a simple, easy-to-clean, dependable, low-vacuum, pipeline milking system. Next, Chore-Boy introduced the Herringbone stalls and feeding equipment with its many time-saving features. With this new system 2 to 3 times as many cows can be milked, per man, as with pail milkers or parlors equipped with side-opening or walk-thru stalls. This new equipment was then packaged and delivered to the dairy farm in a ready-built, durable, insulated building called a Lactorium. Dairymen have shown their appreciation for this new approach to milking by putting Chore-Boy in first place in pipeline milker manufacture. Chore-Boy is now making and selling more pipeline systems than any other company. More than 2,000 Herringbone systems are now in use in the United States, Canada and other countries. Approximately 75 to 80% of the systems are Chore-Boys. Chore-Boy has now applied this new approach to hog production, the results of which are offered in a complete package system known as the Porkorium.

The PORKORIUM... One Pen — One Building From Farrow To Finish

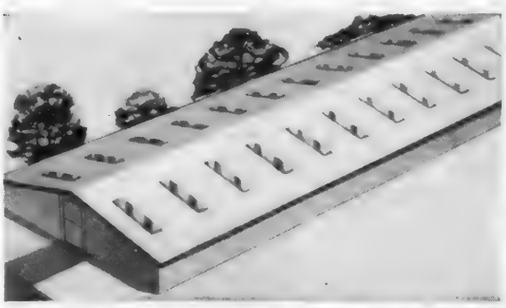
This system was developed in cooperation with Conner Prairie Farms, Noblesville, Indiana, the largest producers of incross boars and seed stock in the United States.

The Porkorium consists of a 32' x 96' insulated building, made in panels and erected on a concrete foundation. The concrete floor is self-draining. There are 24 pens with galvanized steel walls. The building is equipped with automatic feeding, watering and ventilation systems. The sow is brought into the pen before farrowing. There is plenty of room for feeding and exercise. She farrows her pigs in a specially designed Protector farrowing unit which has a heat lamp and an insulated floor to retain heat. At weaning time the sow and farrowing equipment are removed from the pen. The pigs remain until they are ready for market.

Manure is flushed from the pen by high-pressure water. Sanitary pens and isolation of litters reduce the disease hazard. Rate of growth is not interrupted by moving. Maximum use of feed is achieved while labor is reduced to a minimum.

The insulated building is warmer in winter and cooler in summer. Automatic, pressure ventilation provides a constant, uniform supply of fresh air. With multiple farrowing each Porkorium can handle 48 sows and litters, or around 400 pigs, per year. One man can handle 4 to 6 Porkoriums.

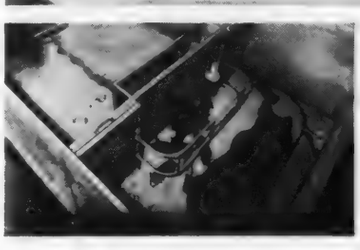
There is a complete Porkorium in operation on a farm near Cambridge City, Indiana, and visitors are welcome. Porkoriums have been sold for erection on a number of Mid-Western farms.



LEFT
Porkorium is 32' x 96'... with 24 galvanized steel pens. Automatic feeding, watering and ventilating equipment. Walls and roof are well insulated.

LOWER LEFT
Sow is comfortable and pigs have plenty of room.

LOWER RIGHT
Pigs remain in pen until ready for market.



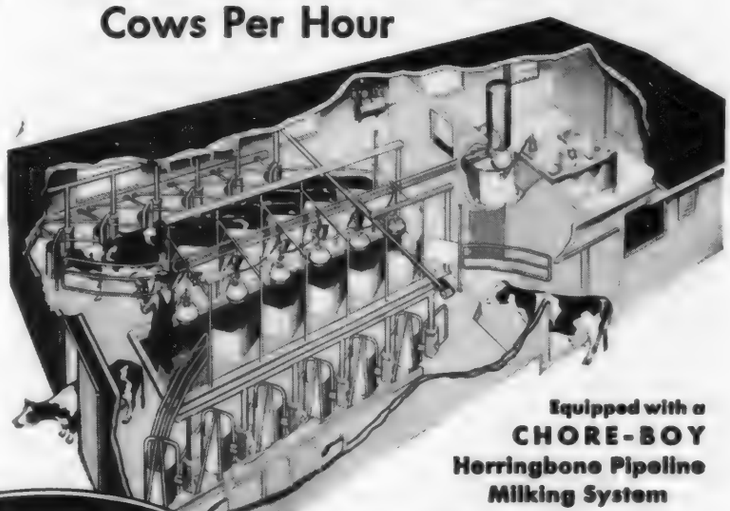
The LACTORIUM... One Man Can Milk Up To 60 Cows Per Hour

The Lactorium is a complete machine for harvesting the most milk, of the highest quality, per man. It does for the dairyman what the self-propelled combine does for the wheat grower . . . what the corn-picker does for the corn grower. But the Lactorium does its harvesting twice a day, every day in the year.

While dairymen can build their own milking parlors for housing the Chore-Boy Herringbone Pipeline System, we have found that this is usually a "headache." It involves plans and contractors and usually requires considerable time. Then too, it is easy to make mistakes in materials and planning . . . and the structure frequently costs more than a Chore-Boy Lactorium.

When it comes to speed and milking efficiency nothing can approach the Chore-Boy Herringbone Pipeline Milking System. One man can handle 4 to 6 milker units and milk 40 to 60 cows per hour . . . and do it at least twice as fast as other parlor systems using side-opening or walk-thru stalls.

The Chore-Boy Pipeline System also has many special features such as: Low-Vacuum, which helps remove a major cause of mastitis; The Master Pulsator; The Pyrex Glass Roll-O-Clean Releaser, the simple cleaning-in-place; and The Roll-O-Measure for determining the individual milk production of each cow.



Equipped with a CHORE-BOY Herringbone Pipeline Milking System

SEE YOUR CHORE-BOY "KNOW-HOW" MAN

Your Chore-Boy "Know-How" Man is more than a dealer and service man. He has been trained to help you put your dairy operation on a real money-making basis. With his advice you will have an efficient plant, producing top-quality milk at lowest cost. See him today. There is no obligation.

CHORE-BOY LOW-VACUUM MILKING SYSTEMS

NEW CHORE-BOY PURCHASE PLAN

With this plan you can use your Chore-Boy equipment while it pays for itself. You may have up to 36 months to complete payment — or 5 years with purchases of $5,000 or more. During this time you are covered by life, fire and comprehensive insurance. See your Chore-Boy dealer today.

Write Dept. 32 for information.

CHORE-BOY MANUFACTURING CO., INC. • Cambridge City, Indiana

Carl L'Orange says

"I put a million pounds of gain on the 2,100 head of cattle fed last year on Fleetwood Farms at Delaplane, Virginia. It couldn't have been done without machines.

"We've invested $90,000 in machinery to run Fleetwood's 3,000 acres. These machines have to keep going. Take our $28,000 feed grinder. If it breaks down the cattle go hungry. Having Timken bearings on it is the best insurance I know against breakdown. We also have eight tractors, three trucks and the equipment to harvest 400 acres of ensilage crops and alfalfa. The Timken bearings on these machines help keep my down-time to a minimum."

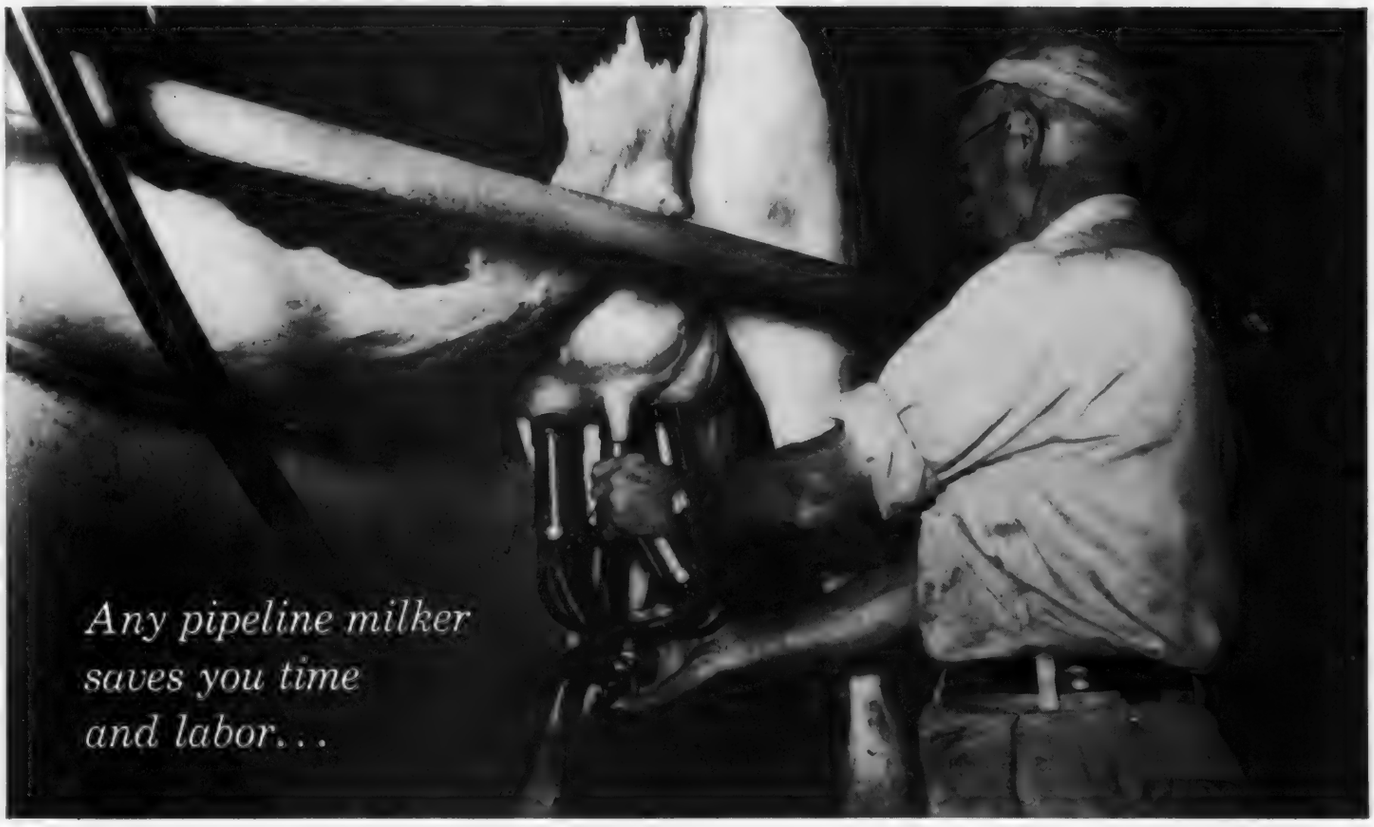
Did you know that every make of farm tractor and almost all implements use Timken bearings? Look for this symbol on *all* the machines you buy! The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN BEARING EQUIPPED

6 OUT OF 7 FARMERS PREFER

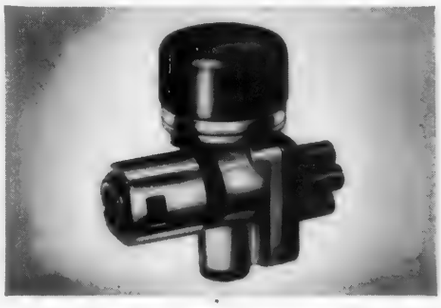
TIMKEN®

TAPERED ROLLER BEARINGS

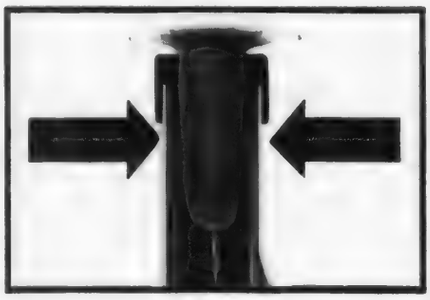


But only De Laval gives you fast, clean and gentle milking!

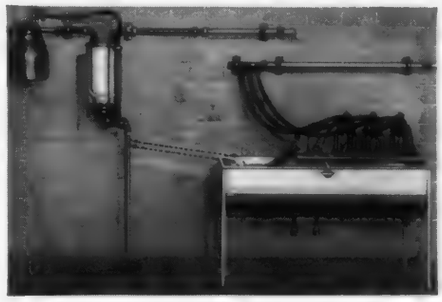
All pipeline milkers are not the same. The big difference is in how they get the milk out of your cows. These three exclusive Combine Milker features show you why De Laval outmilks and outperforms all other pipelines . . .



1. De Laval Magnetic Pulsator . . . the "heart" of the Combine Milker . . . assures you *absolutely uniform* pulsation rate for fastest, cleanest milking every milking. De Laval pulsators are factory set, cannot get out of adjustment . . . and they're up on the stall cock, out of the way of dirt and accidents.



2. Narrow-Bore Liners. This cutaway illustration shows a cow's teat inside De Laval's "Full-Flo" teat cup and narrow-bore liner. Note how narrow-bore liner fits cow's teat like a glove. This minimizes impact on teat when liner collapses, reducing danger of udder injury. Result? Healthier udders, higher milk production, less need for antibiotics.



3. Economical In-Place Cleaning: De Laval cleans by vacuum, not pressure – lets you use 90% less water and two-thirds less detergent than other pipelines. Figure your savings over a year's time! There's a Combine Milker to fit a parlor or barn layout. Call your nearby De Laval Dealer today for a cost estimate on your farm.

You get more than pipelines when you get a Combine Milker. You get the *extra benefits* of fast, clean and gentle milking . . . at no extra cost.

DE LAVAL

10% down...up to 4 years to pay

Combine Milker®

THE DE LAVAL SEPARATOR COMPANY,
Poughkeepsie, New York
5724 N. Pulaski, Chicago 46, Illinois

DE LAVAL PACIFIC COMPANY
201 E. Millbrae Avenue,
Millbrae, Calif.

THE BEST TRUCK FOR YOUR FARM IS THE BEST BUY FOR YOUR MONEY

SEASON'S BEST BUYS RIGHT NOW IN STUDEBAKER TRUCKS!

How would you like an extra-special buy right now in the most rugged, hardest-working, easiest-handling truck made? Go see your Studebaker dealer—he's had a fine year with the record-breaking Lark, and he's in a good position to talk business about any one of the farm-purpose Studebaker trucks that fits your needs best.

Look at his brawny Studebaker trucks, and remember that they're built in the heart of the farm country—South Bend, Indiana—by men who know that your truck won't spend all its time on a concrete highway. That's why you'll find these farm-built features—features that have made the farmer Studebaker's best customer year after year:

High ground clearance for rough going.

Heavy gauge steel throughout the body—double walls in the box body, with a heavy ribbed steel floor to stand years of punishment.

Custom-designed frame for each model, rated by automotive engineers as the toughest in the business.

Variable ratio steering, the easiest in any truck.

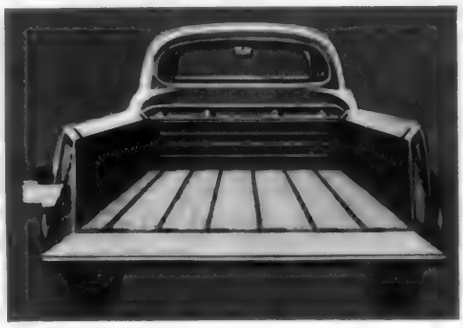
Full-size roominess in the cab for 3 big people—with all-day comfort in the cushions, and sturdy, heavy-gauge vinyl upholstery.

Economy engines—a choice of four—that give top mileage on regular gas.

Oversize brakes—definitely bigger, safer, longer-wearing.

Under-hood accessibility, with no wiring hidden under instrument panel.

You'll be proud to own a Studebaker truck. Proud of its good looks inside and out—proud of the savings you get on low first cost and low operating cost over the years! See your Studebaker dealer this week, and check over the wide choice he can offer you in body sizes, in economy-proved engines, in transmissions, and in the handy optional features shown below. Make your choice—and drive a bargain home!



LOWEST PRICE PICKUP in America is the Scotsman ½ Ton. Yet it has the widest clear floor pickup box, with no wheel wells in the way. Note how the floor bed is closer to the ground, for easier loading without strain.

SPECIAL-OPTION FEATURES YOU WILL LIKE

Twin Traction rear axle keeps you moving in sand, mud, ice—saves using chains.

Wide range of choice in transmissions—standard, overdrive or trouble-free automatic. These are teamed with a variety of rear axle ratios to do your work most economically.

Hill Holder to keep you from rolling back when starting off on hills.

BIG SEASON FOR SAVINGS NOW—WITH STUDEBAKER TRUCKS

Hog comfort and hygiene were prime considerations in the selection of these farrowing and nursery buildings at Trimble Manor swine farm near Trimble, Mo.

For the man with a long view on farming...

METAL BUILDINGS BY BUTLER

The farm factory is already here for a few farmers . . . and on the horizon for many more. This means automatic materials handling, chore handling and farm processing with power equipment.

These new methods demand new and more functional buildings, built to work hand-in-glove with power equipment. The hard way to get them is to build them stick by stick. The easy way—and the quality way is to order the Butler metal buildings you need, and simply have them assembled according to your plan.

Why Butler buildings? There are many practical reasons. Butler offers a complete range of sizes for all your shelter requirements, from a small pump house up to the largest storage barns. Butler quality construction makes the most of metals. Each part is factory precision-fabricated and sized to fit and function perfectly. Butler buildings are fire and lightning safe; rot, rat and bird-proof.

You utilize all the space you pay for. No posts inside—no matter how big the building. There's room to maneuver—room to lay out interiors any way you choose. Roofs are truss-free. Stack hay or bags right into the roof peak, or suspend bins and install overhead traveling hoists with complete freedom. Big, wide doors clear your biggest machines. Butler buildings are for the man with his feet on the ground, and his eye on the future.

Room to spare and weather-tight protection are both readily apparent in this Butler storage building at the Snarr sheep farm near Idaho Falls.

Your nearby Butler Builder is the man to see for details. Ask him about Butler financing. He's listed in the yellow pages of your phone book under "Buildings" or "Steel Buildings." Or write directly to us.

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BUTLER MANUFACTURING COMPANY

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MOLINE'S MULTI-TRADE-IN

MOLINE 5-STAR TRACTOR

ROUNDUP FEATURE No. 1

Looking for more power? Want to cut fuel costs? Want the easier handling of an up-to-date BIG tractor? Trade now for the powerful Moline 5-Star, the one tractor with these big advantages:

1. **HIGH-COMPRESSION HIGH TURBULENCE ENGINE** — Built to deliver 4-5-plow power day-in, day-out at lowest fuel costs. Moline-engineered for all fuels.
2. **AMPLI-TORC TRANSMISSION** — Gives you 10 forward speeds, 2 reverse speeds, "on-the-go" shifting. Doubles pull-power in heavy going.
3. **TEL-O-FLO HYDRAULIC SYSTEM** — Direct-powered from the crankshaft for easier, faster control of tools . . . full-time power steering.
4. **STANDARD 3-POINT HITCH** — Mounts standard 3-point tools — cuts equipment investment. Automatically balances traction to pull.

Make the BIG trade to BIGGER 5-Star power... see your Moline Dealer now!

ROUNDUP FEATURE No. 2

MOLINE G VI TRACTOR

Farming big acreage? You need the big power boost of the new Minneapolis-Moline G VI tractor! Over 80 belt hp . . . 72 drawbar hp (LP gas model) works the biggest implements to full capacity . . . brings per-acre cost to a new low. New "Tru-Balance" traction, new hydraulics for power steering and implement control, new heavy-duty Moline-built engines for LP gas or Diesel fuels. Trade *now* for America's outstanding new 5-6-plow tractor.

About Moline Tractor engines

Moline-built tractor engines have close-grain iron blocks for longest service. Huskier bearings, extra-large piston displacement, heaviest crankshafts — built-in features like these are typical of Moline-built tractor engines. Matched to Moline-built transmissions, these engines will far outlast light automotive types.

MILLION DOLLAR ROUNDUP!

Your Moline Dealer has extra "tradin' bucks"–He's out to top all bids!

You'll look a long way before you'll find the farm machinery deals your Minneapolis-Moline Dealer is featuring right now! He's rounding-up trade-ins as never before, and he's making record-smashing allowances with loads of extra Moline "tradin' bucks" to back him.

There *never* was a better time to trade your old equipment for a new Moline tractor and new, big-capacity Moline machinery. Get in on Moline's Multi-Million-Dollar Trade-in Roundup—get the best machinery deal of your life! See your Moline Dealer now!

TOP TRADE-IN ALLOWANCES!

TRADE FOR:
Champion Moline Corn Pickers
Hay-Saving Moline Balers
Big-Capacity Moline Combines

NEW, EASIER CREDIT TERMS!
Pay as little as 25% down . . . take as long as 48 months to pay the balance.

MINNEAPOLIS MOLINE

Trade in . . . trade up to the New Moline

LOADED FOR GO!

'59 DODGE SWEPTLINE

Empty or loaded, this handsome pick-up performs with the same get-up-and-go. Its spirited 205-horsepower V-8 handles capacity loads with pep and zip to spare. Try this comfortable Sweptline . . . it has the ride and handling you'd expect in a passenger car. Let your Dodge dealer show you it's PRICED WITH THE LOWEST.

PUSH-BUTTON DRIVING

Another Dodge Truck exclusive—just push the button and away you go!

POWERED FOR ACTION

This lively 205-hp. V-8 masters any load, any road. And on thrifty regular gas!

LARGEST LOAD SPACE

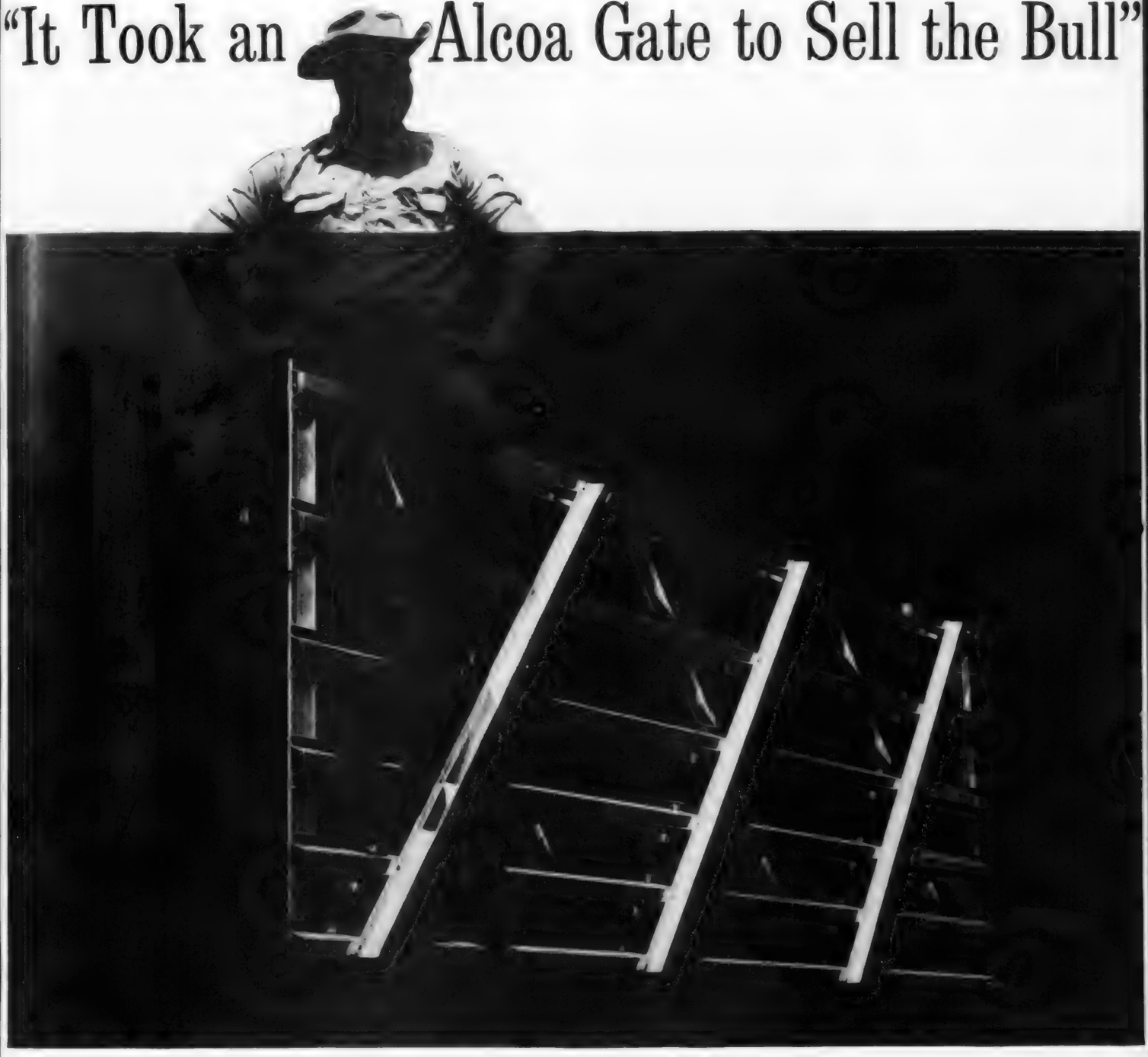
More payload space than in any pick-up. Save trips and time by hauling more each trip!

TODAY IT'S REAL SMART TO CHOOSE

DODGE TRUCKS *the trucks with the most*

SEE YOUR DODGE TRUCK DEALER AND TAKE A DODGE DISCOVERY DRIVE NOW!

"It Took an Alcoa Gate to Sell the Bull"



"Fellow came here to buy one of our registered Polled Hereford bulls a while back," recounts Maurice Wagner, stock farmer at Eau Clair, Pa. "One young bull in particular took his eye right away.

"I made him a fair price but he stalled, kept looking around, wouldn't come to terms. Finally he told me what was holding him up. 'You throw in one of those Alcoa Gates you're fixing to hang and I'll pay your price,' he said.

"I gave him the gate. I hope he likes it as well as we do ours. We have 30 of them on the cattle pens and across the farm. Some have been up three years now; 28 are as bright and sturdy as the day we got them. We had trouble with the other two, but it was our own fault. We hung them wrong.

"Whenever I replace a gate now, an Alcoa Gate goes in its place. They're easy to hang and we don't have to paint them.

"They're easy to open and light to handle, too. That's important to us, because my wife and the children use these gates as much as I do myself," Mr. Wagner states.

Horse High! Hog Tight! Bull Strong!

Alcoa® Aluminum Gates are built rugged, built like a bridge. They can't sag, rot, corrode, warp or twist. Beaded edges, aircraft riveting, made of an extra-strong aluminum alloy. Come 52 in. high, five or six panels, complete with hardware. In widths for 10-ft, 12-ft, 14-ft and 16-ft openings. A 36-in. hog gate also is available.

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

Watch *"ALCOA THEATRE"* Alternate Mondays *NBC-TV*
"ALCOA PRESENTS" Every Tuesday *ABC-TV*

ALUMINUM COMPANY OF AMERICA
1930-J Alcoa Building, Pittsburgh 19, Pa.

Please send me a FREE 10-in. sample section of Alcoa Aluminum Gate rail for my inspection. I understand that there is no obligation.

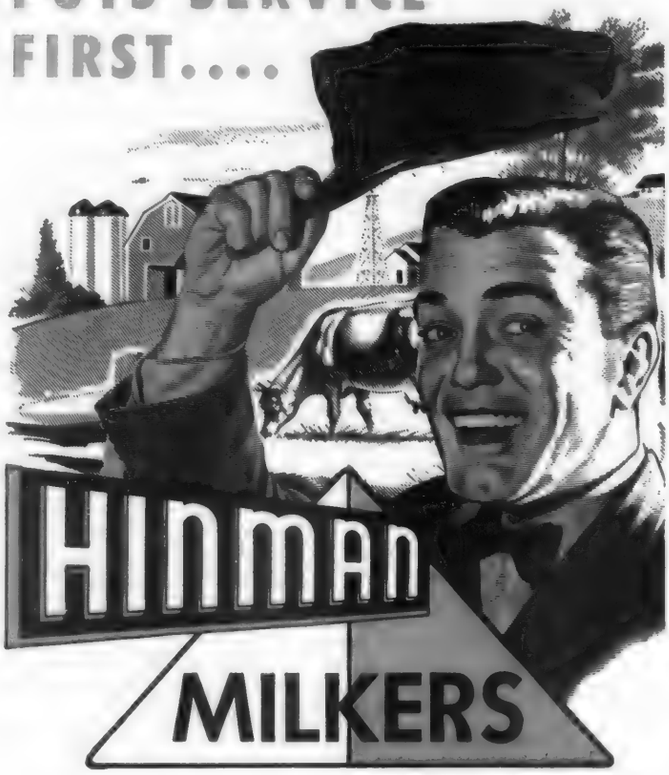
NAME_____

ADDRESS_____

P. O. AND STATE_____

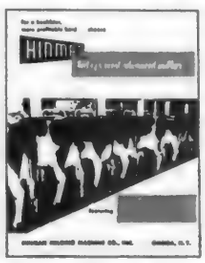
☐ FARMER ☐ DEALER ☐ STUDENT

YOUR HINMAN DEALER PUTS SERVICE FIRST....



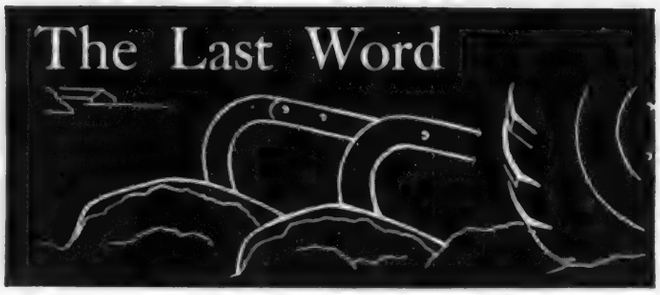
By service we do not mean continuous calls to repair your milking machines. Hinman milkers do not require continuous repairs and a minimum of service is needed to keep them in top shape. All Hinman Low Vacuum Milkers are guaranteed to furnish fast, safe milkings when you buy them and for years to come. Their simplified rugged construction assures the long life and dependable performance necessary for hard everyday use. Repair or adjustment service when needed is promptly attended to. Expansion or remodeling plans for Parlor or Barn Pipelines will be furnished at your request. Your Hinman Dealer can help you with any milking problem you may have because he has access to fifty years milking machine experience by the Hinman Company. Milker Service is your Hinman Dealers business, and he puts service first.

If you would like more information about the complete Hinman Line send for the new catalog shown on the right. You will find details on the Sani-Line and Master Milkers, Cow to Can and the New Milk-Away System. This catalog contains complete installation and equipment photos plus other valuable information on how Hinman Low Vacuum Milking can save you time and work and make your business more profitable.



WRITE FOR COMPLETE NEW CATALOG TODAY

HINMAN MILKING MACHINE CO., Inc.
DEPT. H3 BOX 360
ONEIDA, NEW YORK



For The Hot Head Space scientists and little boys aren't the only ones who are wearing dramatic helmets these days. For that tractor drive on a blistering day you can now don an air-conditioned helmet which will funnel cool, dry air into your helmet and down across your face and chest. The air is filtered to remove dust, fungus, pollen, chaff, and any other air-borne odds and ends. The fiberglass helmet with its clear plastic face-plate is connected by flexible hose to a refrigeration-filter unit which runs from the tractor or combine battery. The cool-headed comfort is said to increase work output by 10 per cent. Jamieson Laboratories, who produce the helmet, tell us the complete unit costs $350 and that it beats the old cabbage leaf under the hat all hollow.

Shipping Fever With cattle being moved from range to feedlot we are in for our annual bout of shipping fever which costs over 25 million loss in cattle alone. It also attacks sheep and swine. We still don't know what causes it and the soft cough, tired appearance, reduced appetite and signs of chilling, watery discharge from eyes and nose, either constipation or scours, and rapid breathing—all symptoms of shipping fever, can easily be confused with signs of leptospirosis, infectious rhinotracheitis, mucosal disease, anthrax and other animal ailments. The American Foundation for Animal Health, which is carrying on a campaign against shipping fever, suggests vaccination before shipping as the best preventive measure and prompt veterinary treatment to diagnose this elusive disease and give it proper medication.

Alaska Humor It was bound to happen. Even Texans are not immune. It seems an Alaskan announced that if Texans didn't stop bragging, Alaska would split itself in two and make Texas the third largest state. Some Alaskans are reported speaking of the rest of us as "the south 48."

Honors We were pleased and more than a little proud when the American Seed Trade Association chose our Associate Editor, John McCallum, as the best farm writer for the past year. The award was based on a half-dozen FARM QUARTERLY articles.

THE FARM'S PICTURES

Cover by Joe Munroe

This is the exact size of the film of the color picture reproduced on page 42 and 43. We are a little amazed ourselves.

10—Courtesy J. C. Andresen. 42 and 43—Karl D. Butler. 43 (upper right) Dr. Arthur Cooper. 44—Dr. Arthur Cooper; Karl D. Butler. 45—Dr. Arthur Cooper. 44 and 45 (bottom) Karl D. Butler. 46—Dr. Arthur Cooper; Karl D. Butler. 47—Karl D. Butler. 48 thru 51—Kazik Pazovski. 52—Joe Munroe. 53—Joe Munroe; Ernst Peterson. 54— Charles R. Koch. 55 thru 58—Don Muhm. 59—Don Muhm; Charles R. Koch. 60 and 61—Drawing by Fred Eichenberger. 62—Drawing from *Horse-hoeing Husbandry*. 63—Photographed by The Broseley Studio through Courtesy of the Royal Agricultural Society of England. 64 thru 66—Joe Munroe. 67—Kazik Pazovski. 68 thru 71—Robert B. Goodman. 72—Yeovil Somerset. 73—Courtesy H. Gordon Green; Edward Pikar. 74—Fred Knoop; R. J. McGinnis; Courtesy J. E. O'Neill; Kazik Pazovski. 75 and 76—Fred Knoop. 77—Courtesy J. E. O'Neill; Laval Co., Inc. 78—R. J. McGinnis. 79—Gray and Rogers. 80 and 81—Grandpa McGinnis. 82—Kazik Pazovski. 83—W. O. Kester. 84—Don Muhm. 85—Fred Hawthorn. 86—Kazik Pazovski. 87—Drawing by Fred Eichenberger; Kazik Pazovski. 89—Map by Fred Eichenberger.

Partners in Profit

How one farmer works with his veterinarian

By Fred Wenright

Know-how and hard work, plus *regular* professional advice from a veterinarian, have realized increased income for this balanced farm operation.

Driving behind a heavy swirl of road dust, which contained the fastest-moving veterinarian I'd ever seen, we turned into Winston Walker's 320-acre farm in Central Kansas.

This was one of the regular stops on the rounds of Dr. M. F. Scoby, 36-year-old McPherson, Kansas, veterinarian. I was about to witness an example of what I hoped to be a sound, cooperative relationship between a typical veterinarian and a representative farmer.

It didn't take much conversation to find out that I was looking in the right place. "If you get a veterinarian to help keep the animals from getting sick," explains Walker, "you can save money in the long run. That's what I do, and I can show you in black and white how much better we're doing now that Doc is working with us."

Deep Roots

Winston Walker was born and raised only a few miles away from the land he owns. He left McPherson County for two years of ag studies at Kansas State University, then 4½ years of army duty. When Walker returned to McPherson County, he was determined to own his own farm and to always do a job *the right way*. He bided his time while he farmed and waited, looking for the right opportunity. Seven years ago it came. His farm is located about 10 miles southwest of the agricultural and oil community of McPherson. He combines the production of hogs and cattle with wheat and milo under irrigation on his two quarters.

Walker feels that his determination to do a job right has been responsible for many well-made decisions, among these is the present "partnership" with Doctor Scoby.

Hired An Expert

Walker explains that good livestock production is dependent upon good livestock health. He felt that the man who could help keep his animals in top shape was his veterinarian. He was the specialist who could *do the job right*. That's why he contacted M. F. Scoby, D.V.M.

Dr. Scoby was graduated from Kansas State University in 1944. He has worked hard and long hours in building his practice in and around McPherson.

With the ever-present cigar in mouth, Dr. Scoby moves calmly but efficiently about his business, vaccinating for the prevention of disease, diagnosing and treating, always perceptive to any symptom a sick animal might reveal.

Every chance he gets, Dr. Scoby teaches the value of prevention to his clients. But when disease does strike, he's equally tenacious in working to prevent the spread of the disease through proper diagnosis and treatment.

Pig Production

Winston Walker's 16-year-old son, Neill, handles the farm's pig production. Dr. Scoby is his top advisor. They have 9 well-hammed, registered Yorkshire boars. They are also raising five litters of Yorkshire pigs, presently averaging over 200 pounds at 4½ months.

Neill Walker says, "These five litters produced 46 pigs. That's an average of over 9, thanks to Doc's. help." Dr. Scoby injected each baby pig with iron dextran three days after farrowing. He feels that the iron injection contributed strongly to the fast weight gains and general thrifitiness apparent in Walker's Yorkshires. Dr. Scoby vaccinated the pigs against erysipelas and cholera, and wormed them with piperazine after weaning. Their basic diet has included a commercial feeding supplement.

Swine Honors

Neill, who hopes to be a veterinarian some day, had a reserve champion gilt in the Kansas State Fair in 1958. His junior yearling sow took first place at the same show. In a Wichita Ag Show last Spring, Neill's hogs placed third in a field of 400 entries. They showed well with a proper amount of backfat and a good dressing percentage.

The money that the Walker's made from hog production last year paid for their new cement-floored pig parlor and exercise yard. "This is the kind of profit we like every year," says Walker, "and Dr. Scoby is just about as responsible for our progress as anybody."

He believes that the money he has paid Dr. Scoby for *regular* professional services is an investment—like an extra assurance of good animal health and a good price at the market.

"And the return on our investment gets bigger every year," Walker said as we shook hands.

Research Laboratories Inc. sells its products only through the graduate veterinarian: the key to better animal health practices on the farm.

Research Laboratories, Inc., Saint Joseph, Missouri

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The Behlen trademark on any farm product is your guarantee of years of trouble-free operation, genuine value, and immediate service.

Rugged All-Purpose Curvet Safely Stores Grain—Machinery

Built of heavy-gauge, deep-corrugated steel, the Curvet packs its strength in the wall. Costs 30% less than most straight-walled buildings; yet, safely stores bumper yields . . . parks the biggest implements. Use for cattle, hogs, hay, etc. In 40' widths; length unlimited. Expands easily. Special drying floors. Grain bulkheads.

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Constructed of heavy-duty No. 2-gauge Bar Mesh Steel. Galvanized with up to 6 times normal amount of zinc — **after welding** — to deny rust a place to start. Exclusive "Steep-Pitch" roof fills to peak without hand leveling. Extra-wide crib doors. From 611 to 1940 bu.

New Weather-Tight Grain Tank Successor to Old-Fashioned Grain Bins

Exclusive weather-tight Eave-Seal makes "Steep-Pitch" Roof a structural part of tank. Fill to peak without leveling by hand. Deep-corrugated vertical panels sealed against weather, insects. Large doors. Special drying systems. 950-15,000 bu.

Portable Behlen Grain Dryer Keeps Ahead of Harvest Crews

Powerful burner delivers up to 4,250,000 BTU per hour. Rugged Axial-Vane fan forces up to 78 cu. ft. of heat-charged, drying air through every bushel every minute. Portable. Batch-Type in 250, 375, 500, and 750-bu. capacities. Use PTO or electric motor. Burn LP or natural gas.

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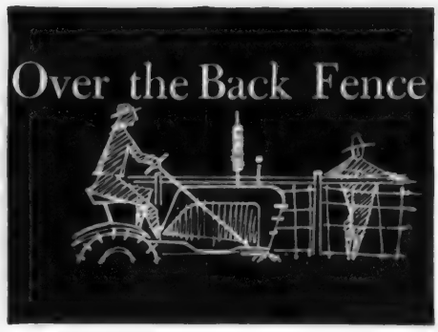

Tips for Tasters In case you would like to take up the gentle art of milk tasting, an Australian paper offers some important pointers:

Warming usually intensifies both taste and odour. With an unknown sample it may be advantageous to warm the milk slowly and gently up to blood heat or even a little higher while taking periodic sniffs.

Chilling dulls flavors and there is little value in tasting milk at 40 degrees F. except to check a complaint related to cold storage. Even so, the flavor will certainly be more readily detected at 60 degrees F.

The taster should make his own choice of vessel for tasting—a cup or a glass beaker—but it is advisable to stick to one vessel. The difference may lie in the mental rather than in the physical sphere, but it is generally admitted that flavor, in the widest sense, does alter with size, shape, etc., of the drinking vessel; and in milk, where odor and texture make a large contribution, the point cannot be ignored.

In tasting, about one teaspoonful should be taken into the mouth, but kept in the front and held behind the front teeth. The tongue may be used to move the fluid about behind the front teeth and the fluid should be slightly sucked between the teeth. Next, throw the fluid to the back of the palate, retain it there for a second or two but do not swallow any. Then spit out. The reason for this ritual is that different parts of the mouth react to different aspects of flavor—acid, sweet, salt, burnt, etc.

If several samples are to be tasted and none is markedly off-flavored, it will suffice to rinse the mouth between samples with water at 60-62 degrees F., but the occurrence of a strongly flavored specimen may shock the palate and gargling may be needed to restore sensitivity.

For regular work, smoking and drinking must be kept to a minimum, and at the actual tasting, false teeth should be removed because the palate is obscured.

What is a Hame? There will come a day, soon, when a man who knows how to harness a horse will be preserved in a museum as an extinct species. Even the nomenclature of harness—the hames, the crupper, the breetching—is passing out of our vocabulary. One exception, hame, has crept back into the language like a tribal memory. To the hipsters, hame, appropriately, means hard work.

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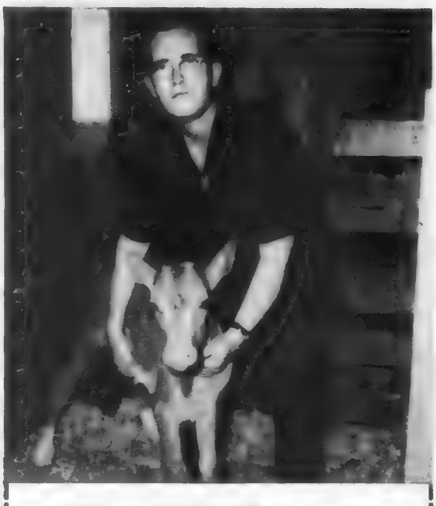
FALL BULLETIN NO. 3



"Green'salt calf program is our first step in growing productive Guernseys!

"Right from birth, every calf we have is fed Sterling Green'salt free choice in addition to her regular starter ration. Green'salt contains salt and 7 trace minerals vital to healthy growth and development, and it is fortified with 10% phenothiazine for effective internal parasite control. We feel that the minerals and phenothiazine in Green'salt help groom our young stock for high milk production . . and we have cows with performances that prove it! When our young stock reach milking age, they go on the Sterling Blusalt program—both in the barn and on pasture."

So says Robert Moffat, Jr., a member of the family that owns successful Grayce Farms in Dalton, Pa. The 150 head of milking Guernseys on Grayce Farms' 2,300 acres are consistent high producers. One of them, Haddon's M. Ida, holds the world's milk-production record for Guernsey cattle. In 1957, she produced 28,787 lbs. of milk and 1,235 lbs. of fat!

Tips on fitting a dry cow for high milk production

Most successful dairymen know that there is more to fitting a cow during the dry period than just feeding to get her fat. Three important requirements in a proper dry-cow management program are discussed below. While this program may cost $20 per animal, the value of extra milk produced will be $40 to $80—*at least double your investment!*

1. Sufficient dry period. Dairy scientists recommend that a cow producing 10,000 pounds of 4% milk a year and calving at 12-month intervals should have about an 8-week dry period. A longer or shorter dry period has been shown to reduce annual milk yield.

2. Daily exercise. If the weather is suitable, a cow should be turned out for two or three hours every day during her 8-week dry period. Outdoor exercise improves digestion and helps build the strength needed to make the coming lactation productive.

3. Proper feeding. During the barn feeding season, it's important that you provide sufficient legume hay, silage and free-choice salt. In addition, be sure to include essential trace minerals, since a cow's future health and lactation may suffer if rations are deficient in minerals.

You can supply both salt and trace minerals with *one* quality product—Sterling Blusalt. Blusalt is salt plus seven trace minerals (manganese, iron, sulfate sulfur, copper, cobalt, iodine and zinc) in scientifically derived proportions.

Specific information on proper care and feeding of dairy cows, other livestock, and poultry is yours for the asking. Write to International Salt Company's Animal Nutrition Department in Watkins Glen, New York.

CONTROL PROTEIN INTAKE "AUTOMATICALLY"—WITH 25% SALT

This fall and winter, you don't have to look after cattle every day in some distant part of your farm or ranch. Simply fill self-feeders occasionally with a mixture of 25% to 30% Blusalt and 70% to 75% protein supplement. Provide an ample supply of fresh water nearby. Then leave the feeders alone. The salt acts as an effective governor which limits daily consumption of protein to the amount you want between one and two pounds.

Try this technique for one season, and you'll see why the practice of using salt to control protein intake is catching on amazingly fast—especially in the range country.

STERLING BLUSALT: trace-mineral salt for free-choice feeding and for your custom grist mixes

100-LB. BAG

Blusalt contains high-quality salt plus seven trace minerals needed for healthy growth. Look for Blusalt in 50- and 100-lb. bright blue bags, 4-lb. blue Liks and 50-lb. blue blocks.

ALSO AVAILABLE FROM YOUR FEED DEALER...

4-LB. LIK

STERLING GREEN'SALT . . . trace-mineral salt plus 10% phenothiazine for control of certain internal parasites. In 100-lb. and 25-lb. bags. 25-lb. bags have a handle for easy handling and carrying.

STERLING GRANULATED SALT . high-quality white salt for both feed mixing and free-choice feeding. In 25- and 100-lb. bags. Also pressed into 50-lb. blocks and 4-lb. Liks—plain, iodized and sulfurized.

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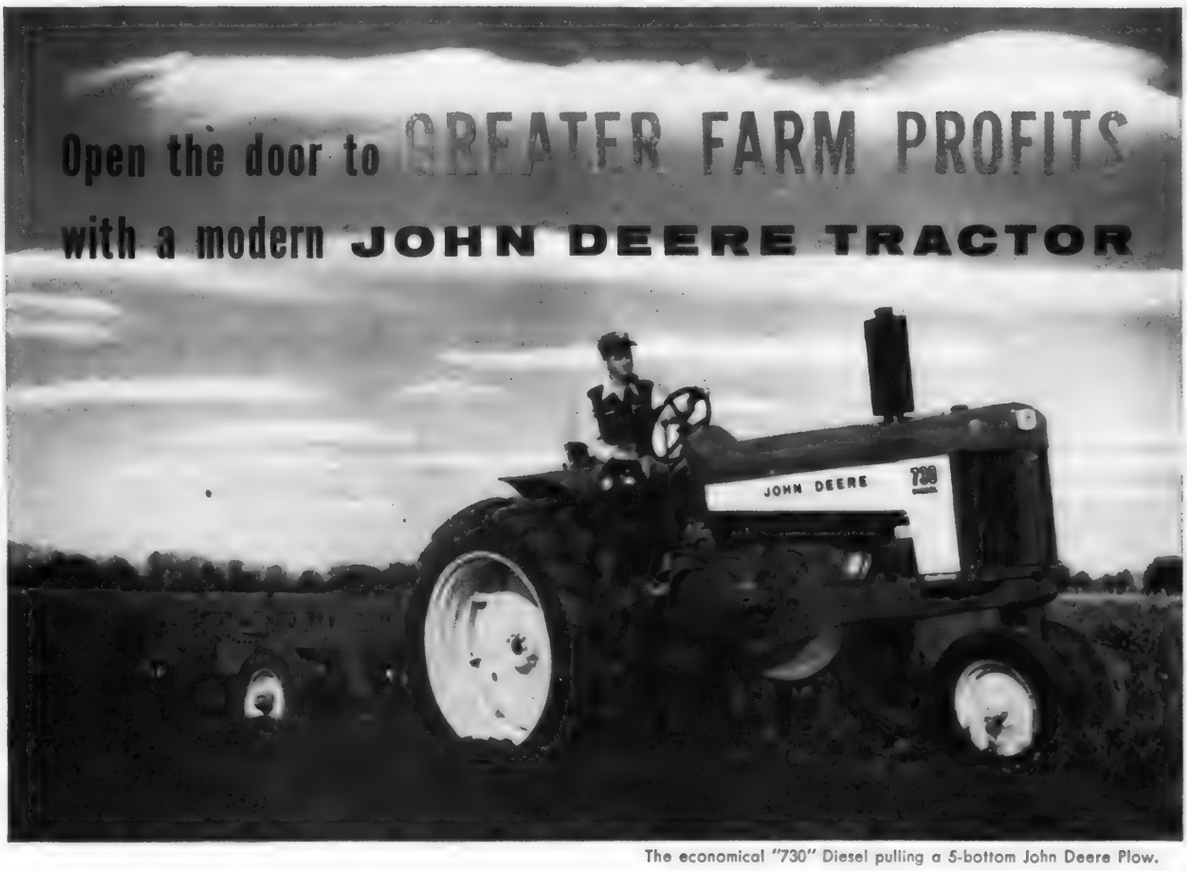
Open the door to GREATER FARM PROFITS with a modern JOHN DEERE TRACTOR



The economical "730" Diesel pulling a 5-bottom John Deere Plow.

The biggest "two-gun" threat to high operating costs is John Deere power combined with John Deere fuel and maintenance economy. Whether you choose the modern 3-plow "530," 4-plow "630," or 5-plow "730," you're on your way to greater dollar savings that mean increased farm profits.

The big difference shows up almost immediately. No longer will jobs lag behind schedule, no longer will the cost of accomplishment bite deeply into your profits. And for you personally, there's a much brighter future, too. You'll work in greater comfort with your two biggest muscle jobs—steering and equipment control—handled hydraulically by the tractor. Throughout the season, your modern, dependable John Deere Tractor will work with all types of equipment, doing better-quality work; saving you time and effort on every job.

The door to greater farm profit carries the name of your friendly John Deere dealer. Do yourself a favor and take advantage of his free demonstration offer. Once you've driven a John Deere Tractor, you'll never want to settle for less.

This 3-Plow "530" Tractor is powering an 8-foot John Deere "AW" Disk Harrow. Gasoline or LP-Gas engines are available for "530," "630," and "730" Tractors; the "730" Diesel features the same engine that holds the official tractor fuel-economy record.

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by Karl D. Butler

RUSSIAN FARM EQUIPMENT

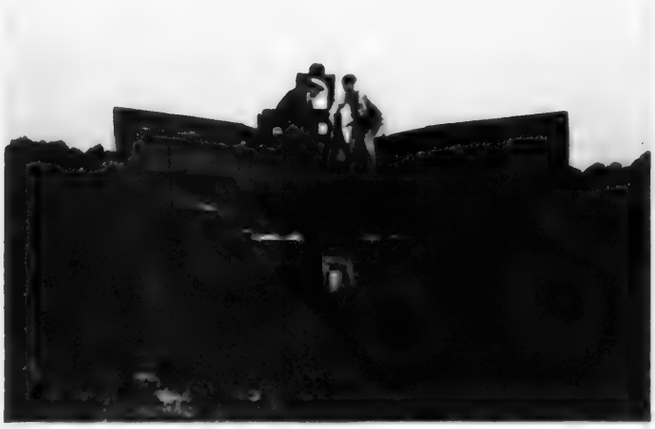
Russia plans to produce 75 small unipurpose tractors (below) every day this year. The two cylinder, air-cooled, diesel, 20 horsepower, self-propelled chassis was introduced in 1954 with a smaller gasoline engine. Costing $700 to $900, it has the engine under the seat. Transmission and final drive are housed in one casting. This display model carries a fertilizer distributor; 20 other attachments are available. The steering column is vertical, and the seat can be spun around it when driving backwards. The steering shaft runs through the left chassis tube. In the background is a corn drill.

Women do much menial work, like the pair (right) carrying chick peas from a winnower. The peas were harvested by machine, but grain handling after harvest is very poorly mechanized. The wooden box and wooden shovels are a common sight.

"BEAT THE United States." "Catch up with American production of milk, meat, wool and eggs." These signs I saw on farms during my visit to Russia. I was very impressed by the sober dedication of the Communists to achieve these goals.

Although it is a year since my 30-day, 10,000 mile trip around the USSR, I am still impressed by the immensity of the industry and power I saw there. The Russians are still behind us in farm mechanization, but they are coming up fast. In some machinery developments they are showing ingenuity and inventiveness. Their goal is to beat U.S. farm output. The whole of their rigid, complicated bureaucracy is being geared to try this.

The rapidity of their mechanization has produced many enigmas, and certainly Russia is a country of extreme contrasts. For example, although Russia has great timber resources—and annual



This V-ditch digger (above) works like a vast snow plow. It is hitched to one tractor, and raised and lowered hydraulically. But one crawler is not enough, and a second machine (both were DT 54's) runs ahead and from 200 feet in front hauls the combination forward at two mph with a cable from a pto winch.

The green combine attachment (left) is built on a self-propelled chassis, painted red on this demonstration model. The 75 horsepower chassis has several attachments, and the Russians began high-gear production in 1958. The straw catcher on the back of this model is common. Most straw is saved, mainly for feed. The combine has a pick-up reel, although a cutter head is available.

This DT 54 crawler (below) is pulling two swathers, giving an overall cut of about 32 feet. This Siberian new lands wheat will be laid in two windrows, and later combined. At least four operators are needed: they often signal to each other with whistles.

This sequence taken near Kiev, shows a new way to make straw and hay stacks. The straw, held in containers (top) behind combines, is piled in the field. The piles are lifted by the elevating buckrake (top right), and stacked on a power tilt wagon. This holds a two or three ton stack, which is slid off the wagon (center) where the stack is to be placed. The Russians claim this method saves labor compared to either baling or field stacking. In contrast to this plan for economy of labor, there are eight men on the combine which gathered the straw (top). This is the regular operating crew. And a lot of straw carrying is done by hand. An interesting sideline is the use of two stacks, close together, as a silo. The silage is compacted with a crawler, and covered with straw or soil. The tractor that carries the loader is a Farmall F 20, or an extremely close copy.

This huge array (right) is a 50-foot power mower. Electrically driven from a generator mounted on the rear of the DT 54 crawler, this is an experimental model. One motor drives the front three blades, separate motors operate each of the four outside cutters. This mower will go through a gate half its width, as the outside blades lift hydraulically. They can also be raised to avoid stumps or stones while cutting. The knives are smaller than the normal width, the guards closer together, and the knife movement shorter. A smaller model is on display at the Soviet Exhibition in New York.

wood growth is believed to be twice the annual cut—there are still vast areas where cattle dung has to be used as fuel—because of the lack of wood. Then, as a trainload of giant logs rolls by in Siberia, one may see, as we did, two men pulling and pushing an old-fashioned two-man saw, making planks by hand. Nearby a giant power plant churned away.

This enigma pervades the Russian scene. While the lifting of the sugar beet crop is almost entirely mechanized, topping the beets is done mainly by hand, and mainly by women. One topper and lifter we saw did such a poor job hand toppers followed it.

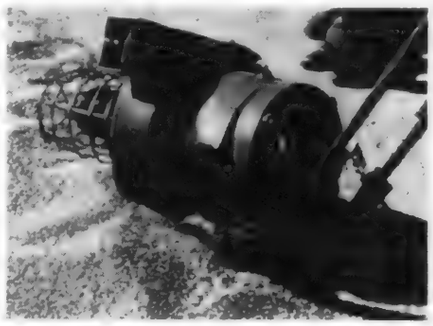
We soon learned the Russians have a unique way of reducing man hours. They use women. In fact, Russians are proud that women have been emancipated to equality with men, and are expected to work beside men in almost every capacity. (Note: Emancipation, democracy, peaceful coexistence, and other words often have entirely different meanings for the Communists than they do for us.) One result is that women are very prominent as workers and in the professions. To aspire to a profession is one way to work away from drudgery. Nearly 70 per cent of all medical students and 40 per cent of all engineering students are women. And, 60 per cent of farmer workers are women.

In the fall of 1958, I was a member of a six-man team studying farm mechanization in Russia. Six teams went to Russia (and six of theirs came here) to study various subjects: agricultural economics, crops, soil, veterinary science among others.

Our first eyeopener was in Washington. We had no visas until a day before we left. All kinds of excuses were given by the Russian Embassy. But, curiously, the visas were issued minutes after a Russian exchange delegation, already in this country, was granted admission to several equipment research laboratories not on their original schedule.

Our visit was among the first of its kind. Until recently, the world outside Russia has known all too little about her life and doings. Even now accurate figures of her farm output are often not available. But we do know more now, perhaps, than at any time since the Russian revolution.

Millions of Russian peasants thought they were fighting in that uprising for the opportunity to own a piece of land. They helped bring the Communists into power. All too soon their dreams faded away as the land was collectivized and developed into large units. The peasants were left with an acre or less per family—a kitchen plot on which they could grow food, and keep not more than one cow, and some hogs, sheep, or poultry. A farm worker's pay includes fodder, grain and some feed, and on this he keeps his animals. Even today it is claimed half the livestock are held in private hands, although the government is trying hard to induce the peasant to give up his individually owned livestock, particularly dairy cows. In some places, milk is sold to peasants at one-third the price the state will pay. This effort to urge the peasant to put his cow in a large herd and give his extra effort to increasing the efficiency of the collective farm has so far largely failed. Apparently the peasants' silent reply is, "I have no land. I own virtually nothing else of my own. I am going to hold on to my cow just as long as I can get away with it." Cows still graze behind the workers' homes as testimony to this passive resistance.



This gadget throws grain around to aid drying. A small auger, just visible, pulls the grain through the cage, and a fan ejects it through the spout. Little hot air drying is seen, though it is becoming more common.

These plots are tiny compared to the state or collective farms that make up 95 per cent of the farmland in Russia. In 1958 there were 76,000 collective farms, averaging about 4,000 acres. At the same time there were just under 6,000 State Farms, averaging 25,000 acres. The collective farms, 70 per cent of the farmland, came from uniting the small farms of millions of Kulaks—small farmers who owned their land and were "liquidated" in one of the bloodiest purges in history when the Soviets took over. A handful of the previous owners sometimes serve on the committees which govern these farms. Many good farmers were lost.

The earliest State Farms were the result of the take-over of large farms of the Russian Czars or others, but the new farm land developed in Siberia is also in State farms. State farms now include about 25 per cent of all the Soviet's farmland.

An Enormous Country

Today, more people live under Communist rule than have embraced Christianity since the time of Christ. About a billion people live under the domination of the Communist atheist ideology. In Russia alone, there are 210 million people and more than half of them work on their half a billion acres of cropland. One Russian farm worker supports three or four off the farm. In the United States, one farm worker provides food and fiber for at least 20 others. Russian farm productivity is not impressive. For instance, Great Britain produces 17 tons of grain per farm worker, Russia just more than one ton per worker.

One of the weakest links in Soviet agriculture is animal production. In spite of any efforts to the contrary, Stalin left a weak, backward agriculture, and a low standard of living on farms. Not many years ago, children were begging for bread on the streets. There is no famine today. Poverty, yes, but no famine. But far greater progress has been made with industrialization. Between 1940 and 1952, industrial production increased 130 per cent, farm output 10 per cent.

Since Khrushchev came to power in 1955, agriculture has been expanded, using modern technology. By taxation and pricing, individual crops and livestock are discouraged. Intensification of this is an object of the Seven Year Plan. This plan, due to end in 1965, proposes a 60 per cent increase in the food and fiber production of the USSR. Some experts believe that the Soviets are farming closer to the level of their experimental knowledge than we are. Their agricultural research is not yet on a par with ours, but they have a greater possibility for improvement than we do, and they use what they know efficiently. I think this is a fair observation, and one about which we should not be too smug.

Questions Answered

During our trip, we asked many questions. Often it was necessary to make a whole string of queries to get adequate answers. Russia

The truck-mounted digger dug a fast ditch, two feet wide and three and a half deep, even though a few of the teeth were missing. A separate engine drove the digger. The line at the right kept the drive straight. This ditch was used to store sugar beet for seed. They were buried over-winter and replanted next spring for the seed crop. The Russians were proud they only lost about 15 per cent by rotting during storage.

Although the Russians claim they have mechanized sugar beet harvesting, these women (top right) had to top the beet, and put them in piles. A truck mounted elevator then lifted them for transport to the factory (bottom right). The beets may be mechanically lifted, and then shoveled into a horse-drawn wagon, still a very common sight. The Russians claimed good yields, with a 16 to 18 per cent sugar in the roots. The car in the back is a Volga.

is a land of intense specialization. There are specialists for most everything but it was almost impossible to find anyone with broad knowledge. Some officials either didn't have the answers or avoided direct replies. Yes, there is little question we were lied to many times. Yet, by contrast, technicians and research workers were highly receptive and friendly and usually gave straight and honest answers to our queries.

Our curiosity occasionally upset their careful regulation of our trip. Sometimes relations with our Russian guides grew pretty tense as they did after we had been prevented from visiting Stalingrad, which was on our schedule. (We later learned Khruschev had spoken there that day. Apparently, we weren't wanted). But the tenseness was shattered when our host, A. J. Loubkov, came, all excited, with four baggage checks. The baggage had not been claimed. We checked and found everything. After a great deal of scurrying around, we found they had given us baggage checks, when we left Moscow, for four watermelons. They were very good, juicy melons, but they didn't last. We had eaten them en route.

Our trip gave us some idea of the vastness of the country. The USSR comprises one-sixth of the land area of the world — some five billion acres. Only one-tenth is cultivated. A third is forest, and much of the land is swampy or, in contrast, lacks sufficient moisture. The majority of the cropland lies north of the United States—almost three fourths of it is north of Maine. Russia is truly a north country.

The growing season is short. Near Moscow it is 130 days, and is 150 days at Kharkov, south of Moscow. This corresponds to southern Minnesota. In the highly fertile Kuban area there is a season of 190 days, roughly the same as Omaha, Nebraska.

Within the boundaries of these basic handicaps of geography and climate, Russia is striving to develop a thriving agriculture. If she is to achieve the increase proposed in her Seven Year Plan, much of the increase must come through mechanization.

Tractors epitomize mechanization in the USSR. They are large, sturdy and tough. They are well built and from what we can find out are used more during the year than the average tractor in the United States. Power and more power is the watchword in Soviet agriculture. Some economists feel the Russians have enough tractor power but its coordination into a system is poor. If a tractor is not big enough for two or three people to operate it, it is not considered in line with their needs. A combine may carry seven or eight. They feel it is inefficient to use smaller equipment in such large fields. There are practically no fences in Russia. All livestock are herded, usually by women, but sometimes by men.

The USSR now claims about one tractor to every 400 acres of arable land, where the United States has one to each 80 to 100 acres. In the United Kingdom there is one tractor for each 27 acres of arable land.

Most of the Russian tractors are crawlers and virtually all are diesel, although they have a few electric ones. The Russians claim that 52 per cent of their tractor population are track layers, but from our experience I feel that this figure is low, and we thought it might be as high as 80 per cent crawler tractors. The DT 54 crawler is probably the most common tractor of any make.

The DT 54 is a 54 horsepower tractor with a 3-point hitch and a pto. The Russian pto runs at 1,000 rpm. They also have some tractors with side pto's. The 3-point hitch was introduced to Russia in 1947 or 1948, and was almost certainly copied from the Ferguson 3-point hitch of about 1944. The DT 54 is manufactured in several places, including Minsk and Stalingrad, Kharkov, and Rubtsovak.

The Russians use crawler tractors where we would use a rubber tire tractor. They have an extremely cheap method of manufacturing new tracks so that the short life and high replacement cost of these parts is partially overcome. They use steel containing 13 per cent manganese, and the tracks are cast and not finished or machined in any way. The pins are simply placed through the track sections and used as they come out of the castings. They do not make over-size pins for repairing tracks. A new set of tracks would cost about 950 rubles for the DT 54, that is about $95. They claim a 600-800 hour life in sandy soil, up to 3,000 hours in lighter soils. A new DT 54 costs about $1700, or 17,000 rubles. However, in spite of these prices and the improved traction of the crawlers, the Russians are turning to wheel tractors and we were told they hope to get 70 per cent wheel tractors within five or six years. They are working on four-wheel drive tractors, and we saw at least two being developed.

Multi-Purpose Tractors

They have two "powered frames" in use today. For about five years the Russians have been producing a small multi-purpose tractor which is virtually a self-propelled chassis. It is a small single-cylinder, air-cooled, diesel, rubber-tired tractor, for which over 20 pieces of farm equipment are manufactured for quick mounting on the chassis. Some of them take only 3 or 4 bolts; all can be mounted in under 30 minutes. The engine and driver sit in the rear, and are connected to the front wheels only by two large pipes. Along the center of one runs the shaft which connects the steering wheel to the front wheels. Along the bottom of each of these pipes is a perforated plate on which the instruments may be fixed. The instruments vary from plows to cultivators, seed drills, and fertilizer spreaders; silage cutters and a two-way plow may also be fitted to the chassis. A new hydraulic dump wagon was demonstrated.

The air-cooled engine began as a single-

(*Continued on page* 124)

The pumpkin-bearing tractor (left) is a wagon bed on the small multi-purpose tractor shown on page 42. Other attachments range from a two-way plow, cultivators or sprayer to a potato digger.

The old way still prevails beside the new. These two farmers in Siberia are cutting planks the way their grandfathers did. Close by was a huge power house, and they were within sight of a jet-liner airstrip.

Cost Accounting on a General Farm

Accounting is a specialty which helps these farmers make sound decisions.

By Chester Charles

CIRCLE L FARM, near Wren in northwestern Ohio, comes near to straddling the Ohio-Indiana border. The farm also straddles the decades. At Circle L past and future are curiously intermixed. The farmstead surroundings might well be typical of grandfather's day. The farm business is conducted along the lines of an accountant's dream. Yet laying hens occupy the second story of a dairy building. Cost accounting goes on at an oilcloth-covered dining room table. A new, electrically-heated ranch house looks out on a turn-of-the-century round barn. Circle L is a hybrid, with hybrid vigor; a general farm, a family farm, holding its own against the creeping threats of corporate farming, integration and specialization.

Circle L is run by determined men. Paul Lichtensteiger, a cautious and careful farmer, heads the group composed of himself and his three sons. As a sort of semi-retired Chairman of the Board, he keeps the daily books and tends the hens and packs the eggs. Fred, 31 and eldest of three sons, does the cost accounting and takes care of the young dairy stock while seeing to overall policy and action in the manner of an executive vice president. Karl, 29, milks the Shorthorns and feeds the hogs. Dean, 23, is on hand for the harvest and whenever he can find time from his job as a professional farm manager. Before setting out each day, and after he arrives home, he minds the chick brooders, tends the dry sows and feeds some of the beef cattle.

All four, Paul, Fred, Karl and Dean, are big men, six foot three or over, to whom hard work is more than familiar. Each, in addition to being responsible for separate enterprises, shares in the field work and in the profits.

Though managed much in the manner of a corporation, the farm business is set up as a partnership. The partnership controls 400 acres, all of which is level ground of fair fertility with frequent low, wet pot holes and requiring extensive tiling. The home place Paul inherited from his father; he acquired additional acres himself and the partnership has purchased more in recent years. The combined farms adjoin each other. There are four sets of buildings, each with a residence and each with small grain and ear corn storage space. Paul lives at the home place, where the main part of the egg enterprise is conducted and where the dairy herd is housed.

The three sons are married, with each owning his own home and the set of buildings that go along with it. At Fred's, young dairy stock is raised and some of the laying hens are housed. At Karl's, the fattening hogs are kept. At Dean's, where the round barn stands, the dry sows and the baby chicks are housed.

In Black and White

Two-thirds of the corn and most of the oats are fed to the stock. The remaining corn and oats and all of the wheat and soybeans are sold. Cash grain sales were their biggest revenue producers in 1956 ($13,000), and again in 1958 ($14,600). Since more than the normal number of hogs were fed out in 1957, grain sales dropped back that year to $6,900.

A five-year rotation is followed, with two years of corn, one of soybeans, one of wheat or oats and one of meadow. In acreage, this year's 140 acres of corn, 32 acres of wheat, 33 of oats, and 71 of soybeans are typical.

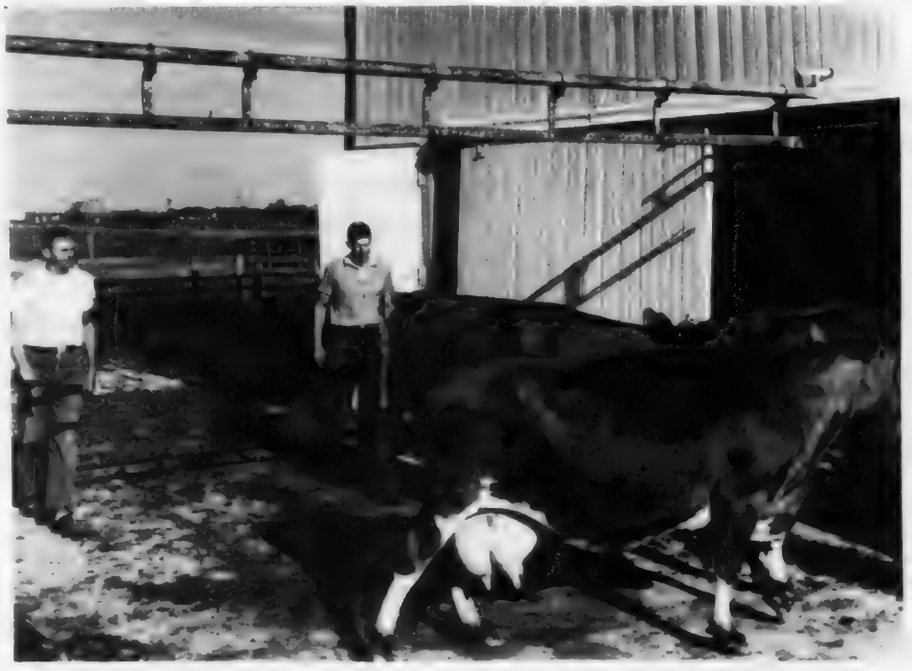
The Lichtensteigers are making a good living but they are not getting rich. The buildings on their land are simple, very practical and, for some of them, a paint job is overdue.

"In the old days," Paul said, "everybody had a few hogs, a small beef herd, half a dozen dairy cows, several hundred hens, a couple of turkeys and the grain to feed the lot of them. Now you can go down any highway and perhaps see beef cattle here, there a dairy herd, chickens over yonder, just as many livestock as there used to be but concentrated by type on just a few farms. The trend in this area has been to rip out fences, sell off the livestock and go in more and more for cash grain. Not us. We've remained diversified partly through choice and partly through necessity. As with a lot of other farmers, our land is not all suited to one enterprise. We can maintain a much better balance by dividing our time and land among four or five enterprises. In addition, we can be flexible as the market changes. We don't have to sell cash grain if the price is off. We can adjust our livestock program, pushing layers or beef or hogs or milk as the situation warrants.

"Our approach is specialization by individuals. Each of us knows a specialty, but we are diversified for security. If it seems like we have a dab of this and a dab of that, our purpose is to use our labor the year around."

Family Conference

Paul is by no means a dictator. He gives the boys a free hand. All three have had college or specialized training in some phase of farming. Each has the final say in his department. Major decisions are, however, subject to rough and tumble family discussion. Paul had this to say: "Judgment comes from experience. Sometimes the boys favor a project or an expenditure that to me seems unwise. But I never over-rule them. We sit in almost daily conferences and each of us has one vote. In fact, in the last few years I have begun to take a back seat. My boys are doing the driving. It is no more than right. My family is raised; my wife has passed on; I have only myself to



Paul Lichtensteiger and his sons, Karl, Fred and Dean, pose in front of the old round barn which is a landmark in the county and a headache to the family. Dean and Karl (right) bring in the dairy herd, Karl's department.

Wheat, oats, soybeans and part of the corn crop usually bring the largest annual revenue as cash grain. Any shift from one crop to another or any greater emphasis on livestock is decided after consulting the records. Their records include man labor time, machine time, land rental and every other cost item for each farm enterprise. Fred Lichtensteiger (below) does most of the record analysis, but the entire family are as familiar with these facts as a good dairyman is with the production records of his cows. Paul Lichtensteiger (opposite page) tends the 2,400 flock of laying hens. The egg cooling room is his summer retreat.

support. My boys do most of the work; they have their families and their futures invested in this venture. They have more to lose than I and should make the decisions.

"One question comes up every year. What should we do with the old round barn? The roof has been bad for a long time. The ground floor pen space is irregular and hard to manage. The mow was built for loose hay and won't support much baled hay, so a great deal of mow space is wasted. Just to reroof it would cost more than an entire new pole barn. So each year we patch the roof and evade the issue. The old round barn is somewhat like me. We've both almost outlived our usefulness.

"The boys want all the facts before they make up their minds. I used to plunge into trouble and then work myself out. Years ago, if I needed a tractor, or thought I needed one, I'd look them over and buy one I liked and could afford, or made myself think I could afford. The boys do it differently. They know from our local weather history that we ordinarily have so many days each spring suitable for plowing, for instance. The amount of ground we plow each year is about the same. The boys choose a tractor according to the horsepower we need to pull the plows of the right size to get done in time every spring. They do the same with other tools. Nothing on the farm is left to chance if planning is possible. It is the only way we can compete with large-scale farming."

By Their Deeds Ye Shall Know Them

An historian of some future century may well go into ecstasy on discovering the records and account books of the Lichtensteigers. They record every farming activity. Each carries a small notebook to keep account of the daily hours devoted to various jobs. A summary of these reports is recorded by Paul in a daily journal, which he has been keeping for more than 30 years. Here are typical entries. Regular chores are taken into account in other records.

Apr 16 Fred Plowed Field RE #3
Intern'l trac . . . . . 10 hrs
" " Karl Spread fertilizer field
RE #3 3 Ton 46% phos
AC trac . . . . . 4½ hrs
Apr 17 Karl Repairs to machinery 3 hrs

At year end, a tally is made from the journal of each partner's work hours as a factor in determining his share of the profits. During the year each partner draws a monthly salary. In every recent year except 1955, the year-end figures allowed for a profit distribution slightly above a $1 per hour rate. While this may seem a low return to the individual, they are compensated very adequately on their investment through realistic charges for rent of land and use of capital.

From the daily journal, the hours each piece of machinery is used can be totaled along with the hours spent on any field, crop or project. With this exact knowledge of the annual hours a tractor or rake or combine is being used, plus the known purchase prices and depreciation charges, the Lichtensteigers establish the costs of operating any of their machinery.

Based on real estate values, taxes, fertility effects of various crops, etc., the Lichtensteigers have arrived at a "land use" charge of $20 per acre for corn and $17 per acre for soybeans and small grains. These figures represent what it costs the partners to use their own land, an item generally overlooked by most farmers, but one which no manufacturer could afford to ignore. What do they do with all these figures? Properly interpreted, they can be shockingly revealing.

For every field, a separate record card is kept for each year. The card shows the date and hours a field is plowed or otherwise worked with whatever tractor or equipment is used. Plowing costs, for example, can readily be calculated, whether a 2 or 3-bottom plow or a small or large tractor has been used. The next step for the cost-conscious partners is to analyze costs according to crops or enterprises. Here is their most recent soybean record.

1958 Soybeans
62.3 Acres Yield 27.7 bu. per acre
Total Production 1,729 bu.

	Quantity	Cost	Cost per Bu.	Cost per Acre
Land Use	62.3 Acres @ $17	1,059.10	.61	17.00
Seed	68½ bu.	161.00		
Fertilizer	1520 lbs. 0-24-24	53.20		
Manure	48 tons	144.00		
Total for Seed, Fertilizer and Manure		358.20	.21	5.75
Labor	262 hrs.	262.00	.15	4.20
Machinery Use:				
A.C. Cultivator	23 hrs.	11.50		
Tractors:				
A.C.	61 hrs.	70.10		
Farmall	102 hrs.	183.60		
Ford	73 hrs.	80.30		
Moldb'rd plow	47 hrs.	35.20		
Disc	59 hrs.	47.10		
Cultimulcher	39 hrs.	29.20		
S.B. Drill	8 hrs.	8.00		
Rotary Hoe	26 hrs.	16.90		
S.B. Cultivator	20 hrs.	9.00		
Elevator and Wagon	50 hrs.	8.64		
Combines	45	123.70		
Corn Planter	13	22.80		
Machinery Total		646.04	.38	10.40
Total		$2,325.34	1.35	37.35

Such records have taught the Lichtensteigers many things they did not know about their operation and have helped them turn to more profitable techniques. For example:

(a) They now send a small tractor to do a small job.

(b) They put a big tractor on a tandem hitch to cut costs by doing several fitting operations at once.

(c) Since their 1958 soybeans cost them $1.35 per bushel to raise, rather than accept a bare margin of profit by putting the beans on the market at harvest time they decided a small grain storage building would pay. They erected a 16 by 20 foot granary which holds 2,200 bushels.

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160-Acre Limitation: the Big

By Joseph Muir

WATER BOILS at 212 degrees Fahrenheit at sea level. Tempers flare at 160 acres in the western United States. And ranchers and farmers in the mountain and Pacific states have been arguing about this one since the original Homestead Act was signed by Abraham Lincoln May 20, 1862. That act limited to 160 acres the amount of public domain land that Civil War veterans could claim and settle. This limitation idea was reaffirmed in 1902 when President Theodore Roosevelt signed the Reclamation law which also limited the amount of land any one person could irrigate with water received as a government assistance.

"It makes my blood run cold," Phil Bancroft of Ignacio Valley, California, fruit grower and ardent foe of the limitation clause, emphatically stated, "when I consider that Abe Lincoln, one of our greatest preservers of American liberties and Teddy Roosevelt, another rugged champion of the principles of free enterprise, started and upheld this socialistic, leveling approach to American agriculture."

Young Dale Carpenter of Red Bluff, California, farming now with his father and waiting at the present time for the Reclamation Bureau's Corning Canal Project to bring water to his own 80 acres, defends the principle. "It's absolutely ridiculous to call the acre limitation socialistic. The basic philosophy behind this limitation of the taking of the public lands and the use of federally developed water was the desire of Congress to give many interested families opportunity to own land and become part of the development of our great country by building the family-type farm. Secondly, it helped prevent fraudulent land speculation by a few persons or corporations who might benefit from the great reclamation projects we all helped to pay for."

In spite of bitter fights and many efforts to break the 160-acre limitation, Congress has reaffirmed the limitation on 18 occasions, from 1906 through 1957 and has been backed up by the Supreme Court as recently as October, 1957. In only three instances has Congress granted excesslands exemptions. These are the Colorado-Big Thompson, the Humboldt Newlands in Nevada, and the Santa Maria, California, projects. The issue has been defended and attacked within both political parties and it is always a hot struggle. Congressman Clair Engle, a Democrat of California, tried to overthrow the limitation in 1954. "And it was met with cold silence," Engle said later. "Land owners did not like it because they did not want to pay the cost and those who have been crusaders for the 160-acre limitation regard it as some kind of sacred cow and accused me of being a defaulter on a principle that has become part of democratic doctrine in the last 25 years. So, I got shot at from both sides."

Republican senators and representatives have tried to accomplish the same thing with equally futile results.

The Reclamation Act of 1902 was a response to the decline of land with adequate water available for homestead. Its basic provisions were to establish a reclamation fund from the sale of public lands and use the money to build irrigation projects with settlers agreeing to repay the costs, interest free. It held to the homestead laws by limiting the delivery of water to private land owners to a maximum of 160 acres for each individual. Roosevelt hoped the original $40 million appropriation would be used over and over again for the completion of other projects as old ones were repaid. It was his hope that no additional appropriations would be necessary. Actually, up to 1936, reclamation expenditures had reached over the $431 million mark. Since then, over $2 billion has been spent, not only for individual projects but for great river valley developments. The water which is made available by these projects reaches the farmer through the canals of his irrigation districts.

The Irrigation District

Enabling legislation for the formation of irrigation districts was developed and passed by the irrigation states between 1860 and 1900. These districts were given the

(*Continued on page* 93)

Dale Carpenter (above left) and Phil Bancroft (above right) are two of the thousands of western farmers who argue the 160 acre limitation. The huge Glen Canyon dam now building on the Colorado will bring water to desert sections of Utah and Arizona and keep the water limitation question boiling.

160-Acre Limitation

Water from Bureau of Reclamation projects such as the Grand Coulee, Shasta, and Glen Canyon is limited to enough to irrigate 160 acres for each farmer receiving it. The exact amount depends upon the crop. In these days of growing farm size, there is sharp conflict about this section of the law. Opponents claim you can't control economic growth by edict—unless you want to become socialistic levelers. They say farmers are the only citizens limited in their growth—a sort of second-class citizen. Supporters of the limitation clause insist it is the only fair and democratic way to distribute the water giving all farmers an equal chance. Without limitation, they claim, huge land corporations would soon dominate these billion dollar projects built at the public expense.

Water Fight

Well Bought is Half Sold

A man who buys cattle for hundreds of feedlots tells how to put this adage into practice.

"THAT'S A NICE BUNCH of black calves, but if I were buying 'em it would be with that little slick-eared rascal out. He's leggy and tight-hided and has a hind end like a jack rabbit. His mammy was a milk cow as sure as he's standing there." So said George Diedrichsen from his ringside seat at one of the Nebraska auctions a few weeks ago. "Big George", an amiable giant of a man in his early 50's, is an order buyer. He and his son Howard also feed up to a thousand or more cattle every year in feedlots on his farm near Bancroft, Nebraska.

Auction ring bleachers were never designed for comfort; so George carries his own specially built, well-padded seat and back rest in the trunk of his car as he travels from market to market. When he walks in a sale barn, hitches this rig on a front-row spot and lowers his six-foot four-inch frame into it with one eye on the auctioneer and the other on the cattle, he is ready for some serious bidding.

Diedrichsen's clients are farmers and cattle feeders whose operations vary in size from the beginner with 10 or 20 head up to the largest in the business, men who consider their lots empty when they are down to a couple of thousand cattle. During the winter he buys for a half dozen or so packing houses as well as for his feeder customers, thus maintaining an intimate knowledge of the standards to which the finished animal must conform. His years of experience buying every type of cattle for every kind of client qualify him to advise with authority how to buy stockers and feeders.

Understandably, Diedrichsen is prejudiced in favor of his own profession. In his book, any man who buys livestock only a few times a year is strictly an amateur playing a game dominated by professionals. "Let me give you a few examples to show you what I mean," he'll say. "Take these black calves. Like I said, I'd signal the auctioneer I was bidding with that one out. But the amateur doesn't know the language. He buys the whole lot and pays five dollars a hundred more than it's worth for the slick-eared one. That's a twenty-dollar bill on a 400-pound calf. On that whole lot of eight calves he'd only pay an order buyer a total commission of $4.80. That's at 15 cents a hundred.

"Or take the case of the fellow who falls in love with a pen of cattle he sees out in the yard before the sale. As soon as they come in the ring he sits on the edge of his seat and begins to bid and he never stops until he buys them. He tips his hand to every man in the barn. So they let him have 'em—sometimes at $2 or $3 a hundred more than they're worth.

"Then there's the fellow from back in the corn belt who makes a trip out to the range country to pick up a load or two of 'just the right kind of stuff'. Of course, he can write the trip off as a vacation if he wants, but if he doesn't he has a couple of hundred dollars tied up in those cattle before he ever buys them. His time is limited and he usually doesn't know anyone in the area who can advise him or give him a little moral support. Maybe, just at the time he gets out there the market firms up a bit, just a temporary flare-up that'll settle down in a few days. But he doesn't have a few days to wait. He has to buy something and buy it right now. So instead of the yearlings he wanted he winds up with calves, or vice versa, and pays a premium for them.

"The amateur pays little or no attention to fill, he forgets to ask for shrink if he's buying off the range, he's blind to indications of disease, he's a poor hand at estimating weights, and his only reliable guide to age is a birth certificate. Look at this!" And Diedrichsen pointed to a lot of white-faced steers the auctioneer had introduced as "yearlings." "That fellow over there thinks he's bidding on a bunch of young cattle. Look at those heads, those feet, the tails! If they're an hour old they're threes. He'll get them home and they'll never gain. The heads and horns, the feet and tails always keep growing. That's the way you can tell age on cattle. Some traders might pull those tails to make them look younger; but on that bunch they'd have to dehorn, too."

But if a man is still determined to do his own buying George doesn't mind telling him how to go about it. "When a man gives me an order for some cattle," he says, "there are four things I want to know. How many does he want? What size? What quality? And what price does he want to pay? The man who is buying for himself must ask himself the same questions. The price is going to be determined largely by the current market. The answers to the other questions will depend a lot on his feeding program.

"You have to fit your cattle to your feed. If you have a lot of roughage you'll want the kind of cattle that can utilize

(*Continued on page* 144)

"Cattle buying is no game for the amateur," says big George Diedrichsen, Nebraska order buyer. "Quality, condition, weight, fill, disease—these are just a few of the factors a man has to contend with when he's trying to get his feeders well bought. When buying on the range (above) always be careful of the kind of arrangement you make for handling shrink."

Auctions are big business. Last year they accounted for more than half the livestock sold at all public markets. A few of them handled as many as 400,000 head each. Still, they have a personality all their own which exerts a distinct attraction for both seller and buyer. Here is an analysis of what makes them tick, together with advice on how the producer can use them to his best advantage.

Auctions make their bid

THE CHANT of the auctioneer is growing more vigorous day by day in the world of livestock marketing. Railroads made the terminal markets; trucks and highways have led to the upsurge of the auctions. Compared to the barely five dozen terminal markets operating in the United States today there are some 2,400 auction markets. While many are small-scale operations not to be mentioned in the same breath as yards like Chicago, Omaha, or South St. Paul, they accounted for over half the livestock which went through all public markets last year. Salable receipts of cattle, calves, hogs and sheep on all markets in 1958 totaled 108.9 million head; 62.5 million of these were sold at auction.

Half of these auction markets failed to handle as much as 10,000 marketing units (a marketing unit is one head of cattle, 3 calves, 4 hogs, or 10 sheep and lambs). But the big ones, considering the fact that they are usually located away from the centers of population and operate only 2 or 3 days a week, handled considerable volume. The Norfolk Sales Company at Norfolk, Nebraska, for example, within 120 miles of Omaha and even closer to Sioux City, sold the largest volume of any livestock auction in the country last year. The 260,000 head of swine and 148,000 head of cattle and calves plus the sheep and horses that went through the market grossed $38.5 million.

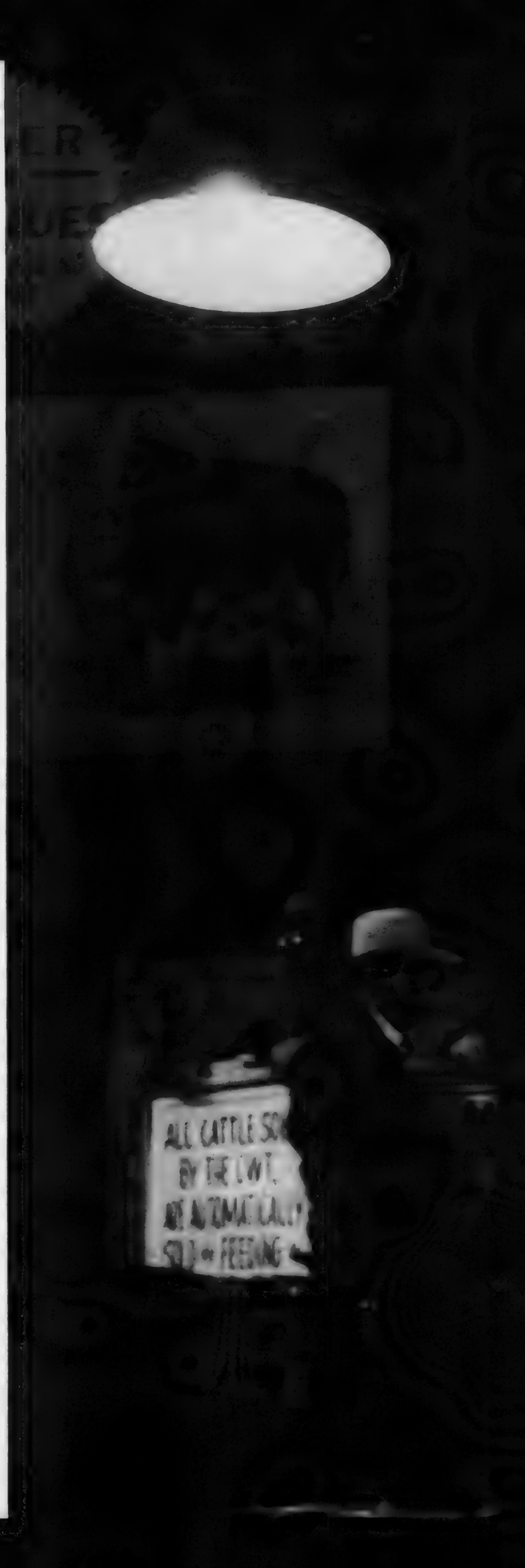
In Montgomery, Alabama, 249,000 head of cattle and calves changed hands last year, "enough to make a cowtown out of any place," as dapper W. I. "Red" Bowman, owner of the Capital Stock Yards, puts it, and the majority moved through the three auction markets of the city. The Amarillo Livestock Auction, in the Texas Panhandle, sold 216,000 cattle and calves to maintain its title as the world's largest cattle auction.

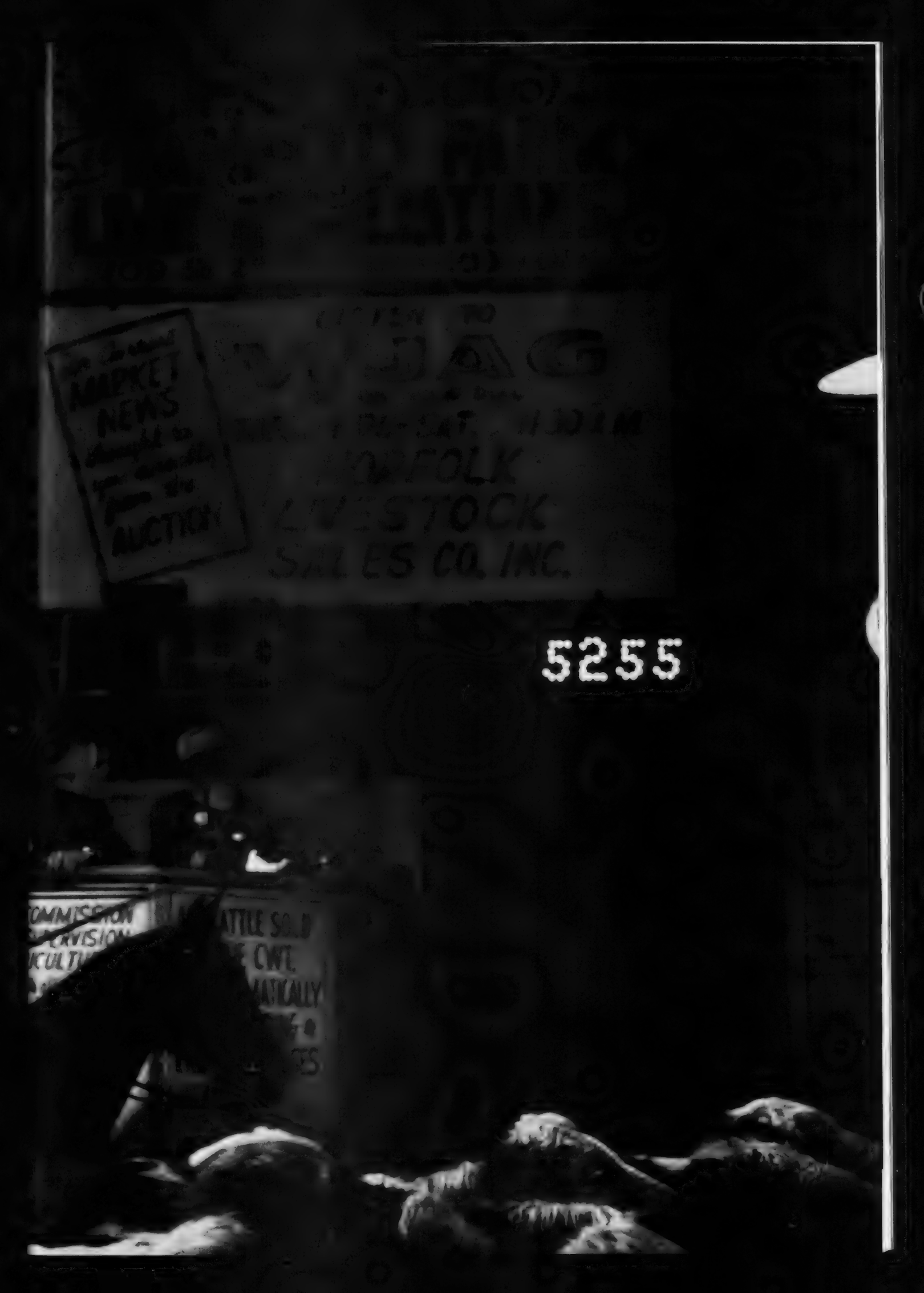
But the figures are only part of the story. They are, as the pundit would say, the symptom, the point on the thermometer; the important thing is how did the figures get that way and what do they mean to the livestock producer?

What makes a market? Buyers and sellers. When markets fold up and fade away the primary reason is seldom the lack of physical facilities. It may be that the producers have been squeezed out of the area by the influx of industries and suburbia, a common situation around many of the larger terminal markets; or the consigners may find it more convenient to ship to a location close to home; or they may have lost confidence in the management or selling methods employed. When this happens they turn to another outlet to dispose of their stock.

More and more farmers and ranchers seem to be dissatisfied with the private treaty method of selling livestock. Whether it is simply the blatant assurance of the auctioneer's "Start 'em at twenty and ten, ten, now twenty, now twenty, and thirty, thirty, thirty . . ." or something more significant, they seem to feel they are getting a fairer shake in the ring than in the alley.

When sellers leave there is no point in the buyers staying around. But wherever a market is readily accessible and no one individual or clique is permitted to monopolize the bidding the




MARKET
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buyers will be on hand if the offerings are there.

So, along about the mid-30's when the pinch of the depression was forcing new economies, local auctions seemed to furnish just the prescription farmers and ranchers needed to cut their shipping costs, and it was at this time, particularly in the North Central states, that these markets mushroomed, totaling over 1,300 by 1937. Today the danger may be that in some areas there are too many. And like the terminals, they are running up against persistent competition in direct buying.

Under an amendment to the Packers and Stockyards Act (a federal regulatory law which formerly applied only to public stockyards with 20,000 or more square feet of space) passed last year, every auction market, or, for that matter, every livestock dealer who engages in interstate commerce, now comes under the regulations of the Act. In effect this is something like a nationwide code of ethics for the trade, working to insure accurate weights, protection of the funds due consignors, full and accurate accounting, reasonable and adequate facilities at fair and nondiscriminate rates, and open, competitive conditions.

Ring-side Seat

One of the characteristics of the auctions is that large or small they are all of a stripe. Some of the newer arenas with their air-conditioned rings and well-padded seats, their electrically controlled doors and pneumatic tubes to whisk the sales tickets from auction box to office may look flossier than their older colleagues, but the spirit is the same. There is no sophistication at ringside.

Much more than on the terminal markets where the producer can select from among a number of active commission firms to market his livestock, the auction market is a direct reflection of the ability and personality of its management. If that one man and his immediate associates fail to make a favorable impression on the livestock producer of the area the market hasn't a chance. If he and his crew are alert and aggressive there will always be plenty of buyers and sellers on hand.

The points which make a good auction market can best be evaluated in watching the smooth workings of one of the best. Take the Emrich operation at Norfolk, Nebraska, for example. This market, the Norfolk Sales Company, already mentioned as the largest in the country in point of volume is also a good one to observe to see how a well-run auction functions.

Sales are held here three days a week—hogs and dairy cattle on Tuesday, beef cattle, stockers and feeders and butcher cattle on Friday, hogs and horses on Saturday, a schedule which, on the surface, appears not particularly attractive considering the difficulty terminal markets encounter in getting consignments later in the week than Wednesday. But, as Ces Emrich, one of the sales managers, is quick to point out, "Friday has been sale day in Norfolk for almost forty years. Farmers here are just in the habit of coming to the sales on Friday. Saturday is a real good day for our hogs, large numbers of which are bought by order buyers and are shipped to points in the East and on the West Coast where they arrive in time for a kill early in the week. Tuesday supplements the Saturday sale. Hogs bought that day can still get to the West Coast for slaughter before the end of the week."

Short, greying Ces Emrich, still on the bright side of 50, is the general impresario of the Company. His quiet, unhurried manner has a way of inspiring confidence in his customers, and when he takes over the auctioneer's gavel, he can sell with the best of them.

Ces, his father, Otto, and his brother, Bus, bought the market in 1942. The elder Emrich had been a farmer and trader and for a while in the mid-30's he had an operation where he would buy horses in Nebraska and ship them to Ces who had a ready market for them in Virginia and North and South Carolina.

Today, Otto Emrich is retired from the business. The company has been incorporated and is in the hands of Ces, Bus, another experienced, eminently capable marketman; Adolph and Don Zicht, a father and son team of auctioneers; and Joe Bothe, hog salesman supreme. All except Bothe take their turns in the auction box on sale days, each man selling for an hour, then alternating as starter or ringman.

Typical of the kind of homely, intimate incidents that help to

make the auction a human institution was an occurrence in the Norfolk barn one day last winter. It was a Friday, cattle day. The wooden benches in the semi-circular arena were filled with buyers, sellers and spectators almost to their 700 capacity. With 3,300 head of cattle to sell, time was a precious commodity. Yet, when Ces Emrich took over for his early afternoon hitch in the box, business gave away to something more important.

"Folks," he began, "you all remember Tim Preece, who for more than twenty-five years was an auctioneer on this market. . . ." To the accompaniment of an occasional lowing of a steer in the yards, he went on with a simple eulogy to a well-loved member of the trade on whom the gavel had fallen for the last time that week. Then there was a minute of silent prayer and a sudden return to the business at hand—

"Well, here are some heifer calves! All right, 27, a quarter, a quarter, a quarter, a half, half, half, half. Sold to 97." (Every buyer has a number.)

Instances like that, or a clever auctioneer playing with his crowd —"You biddin' up there or fightin' flies?"—are the things that give the auctions an added attraction impossible to measure in dollars and cents.

The facilities at the Norfolk market are in no way fancy. There is a modern office staffed by a crew of four to six bookkeepers under the supervision of two office managers. There are loading and unloading docks and enough pens and yard space to handle close to 6,000 head of cattle, 8,000 hogs.

Forty full-time workers, plus an additional 10 to 20 part-time helpers, speed the flow of the stock from docks to pen to the ring and back to the pens.

The hogs are sold in their own ring which is in a building separate from the cattle auction. The cattle ring is semi-circular and large enough to hold probably 60 head.

Phone facilities are provided for the buyers at both rings, the phone booths in the hog arena being right in the ring. A buyer can bid on a lot while he talks to his principal, if necessary.

The livestock are weighed immediately after they leave the sales ring and the weights are flashed in lights on a board above the auction box. (On some markets the animals are weighed before they enter the ring. Weighing is a crucial function on any market. One marketing expert has suggested that one of the best public relations moves an auction could make would be to secure a set of weights and calibrate its scales in the presence of the patrons at the start of each sale.) From the scales they are yarded to the buyers' pens. The traffic is directed by a yardman who sits alongside the weighmaster, a plat of the yards in front of him, from which he can determine at a glance which pens are open and where the stock can be driven with the least confusion. This is one of the crucial points in keeping the sale moving at a steady pace.

None of the offerings are tagged here as they are at many sales. Each consignor's stock are identified by pen number.

And one of the unique things about the Norfolk cattle sales is that most of the consignments arrive the evening before. It is an unwritten rule that all slaughter cattle must be in the yards before 8 o'clock in the morning when the sale starts. This butcher stock is always offered first and any not on hand at 8 must take its turn during the stocker and feeder sale later in the day. In this way the packer buyers are guaranteed that the offerings are not carrying big fills and will yield well.

The consignments are sold in the order in which they are received, an occasional load being moved forward or back to a position where it is hoped it will sell better and also enhance the sale of the loads immediately following.

To enable buyers and sellers to estimate at what time any particular loads will appear in the ring, a chronological list of all offerings, identified by pen numbers, is available by the time the sale starts. This supplies another motive for getting consignments to the yards on time. Anything which arrives after 8 o'clock does not appear on the list and must take its turn after all listed consignments are sold.

While most butcher cattle are run through in singles or in lots of 2, 3 or 4, large bunches of similar grade are frequently sold together and stockers and feeders are often sold in lots of 20 or more.

Most of the cattle are sold by the pound, yet an occasional bunch of stockers or feeders will be knocked down by the head. "Our job is to satisfy the consignor," Ces Emrich says, "so we sell them as he wants them sold. Sometimes a bunch will sell better by the head. A man may have gone to his bank and borrowed a few thousand dollars to buy some cattle to fill his lot. He sees what he likes in the ring but he may not be too good on estimating weights and he's afraid to bid by the pound for fear he'll buy more than he can pay for. So we sell them by the head and it's easy enough for him to figure how much he'll have tied up in them."

Price Support

Like most well-run auctions, the Norfolk Company carries its "market support" account. A starter, in the box with the auctioneer, makes the opening bid on each consignment. He is an expert on grades and values and has a shrewd appreciation of the minute-to-minute appraisals by the buyers of the offerings in the ring. He starts each lot at a figure he estimates to be close to its real value. He must be right an overwhelming percentage of the time. If he is consistently low he will unduly slow up the sale and depress prices. If he is too high he will cause a lot of "bucking away" by the auc-

(*Continued on page* 100)

The ringman (left) provides an extra pair of eyes for the auctioneer. He watches the bidders in his section of the arena, keeps track of whose bid is current. The weighmaster (below) has the highly responsible job of getting accurate weights on the consignments. On the Norfolk market the stock are weighed after they are sold.

A phone booth in the sale ring makes it possible for the hog buyers to bid while talking to their principals. Dust masks are standard equipment for these campaigners who often put in 12 hours or more around the ring where the sawdust carpet is constantly pulverized by the feet of thousands of swine.

Pasteurized Pond Water

FOR FIVE HUNDRED DOLLARS, perhaps less, you can build a continuous flow water pasteurizing unit. For a power cost of 40 cents a thousand gallons, it will provide safe drinking water from farm pond, river or creek. A simple gravel and sand filter will clean the water, and the pasteurizer will leave no chemical taste.

The unit is made of readily available parts, with the exception of the heat exchanger, which must be constructed. The exchanger can be assembled from simple copper parts by a good local coppersmith for about $90 (without insulation).

Plans for assembly of the complete unit, including detailed diagrams of the heat exchanger, wiring diagrams and complete material lists are available free from THE FARM QUARTERLY.

The pasteurizing unit was developed at the Sanitary Engineering Center in Cincinnati, by the Water Supply and Water Pollution Research Branch of the Public Health Service.

The pasteurizer uses the same temperatures needed to pasteurize milk. This leaves a considerable margin of safety, as water is a far less favorable place for bacteria to develop. The water flows through the unit, which can be housed in a 24 by 26 by 36-inch cabinet, and is heated to 161 degrees Fahrenheit. It is kept at 161 degrees for 15 seconds, after which it is safe. Most of the heat required to pasteurize the water is recovered in a simple heat exchanger, where the treated water cools itself by warming the incoming water to 151 degrees. This cools the treated water to within 10 degrees of the temperature of the untreated water. Little heat is lost, and the actual heater has less to do. The electricity used is 38 to 40 kilowatt hours per thousand gallons, so the cost would vary with the local price of electricity. One cent per kilowatt hour is a fair average.

The pasteurizer will supply water for a family of five. Their average requirement, 90,000 gallons a year, can be produced by the unit working only 12 hours a day. The water engineers also designed a larger unit for double this supply at slightly higher cost, and a unit with a gas heater. The gas heat was not as economical as the all-electric unit.

The Flow Circuit

The filtered water from the pond enters the heat exchanger, where it is heated to about 151 degrees Fahrenheit by the hot treated water. It then goes to the pump which pushes it to an electric heater. This raises the temperature to the required 161 degrees. After the heater, the water travels 30 feet through insulated retention pipe. This keeps the water at 161 degrees for 15 seconds, because the flow of the pump is adjusted with a by-pass to hold the water 15 seconds in the retention tube.

An air relief valve is fitted either after the heater or after the retention tube, to release gases that accumulate as the water is warmed. The relief valve has to be at the highest point in the piping. Next comes a thermometer and a thermo switch. The thermo switch controls a three-way valve. If the water is not at 161 degrees when it reaches the thermostat, it is recirculated to the pump and back through the heater. Thus no untreated water can reach the storage tank. The thermometer, with a visible dial, is a check on the thermostat.

If the water is at 161 degrees at the thermostat, it is directed back to the heat exchanger, and from there to the storage tank. Several types of switches can be fitted to the storage tank, depending on water use. A pressure switch can cut off the unit when the tank is full, or a depth switch can stop water flow when the tank is full and start it only when the tank is almost empty. This prevents waste, as the unit does not start for small water use.

From the storage tank a separate pump moves the water to household outlets, unless there is gravity feed. The price of both tank and pump are included in the five hundred dollar cost. However, most houses will have a storage tank and pump that will serve. This will save about $180.

The engineers used a sump switch to prevent the unit from operating without water, and four pilot lights, to indicate proper operation of the unit. One shows if the storage tank is not full, a second comes on when water is flowing past the thermo-switch at 161 degrees, pasteurization temperature. The third lights only if the incoming water fails. The fourth light glows when the heater is operating.

The Heat Exchanger

The heat exchanger is the only part of the unit not commercially available. It is very simple; one hundred feet of ¼-inch copper tube and one hundred feet of ½-inch copper tube. The smaller tube is uncoiled, and slid inside the larger. Some coppersmith work seals the ends, and the hundred foot exchanger is wrapped in glass wool insulation ($2.00), coiled in the cabinet, and packed in vermiculite insulation ($8.00). The exchanger parts cost about $65 including the insulation. Complete instructions are available, and should make the job simple for a local coppersmith.

The water is pulled from the heat exchanger to the pump, treated, and then returns to the outside "jacket" of the exchanger. Thus the treated water in the jacket is under higher pressure. In the unlikely event of a breakage in the exchanger, treated water would leak to the untreated side. Unsafe water could not enter the treated water.

The materials listed on page 61 are not the only ones which could be used. Many others could be satisfactorily substituted. The costs given are *approximate retail prices*. A contractor, buying at wholesale rates, might save enough to partially pay for the assembly.

The pump has to run in hot water, and several were tried before the model used was found to be successful. The water flow through the pasteurizer must be between .35 and .40 gallons per minute. This insures the correct 15 second period in the retention tube at pasteurizing temperature. The pump flow is 1.5 gpm, and most of this is recirculated in the by-pass of the pump. A needle valve in the by-pass controls this flow, and is adjusted during construction. The larger pump and by-pass were necessary as many pumps with a low flow are not designed for continuous duty.

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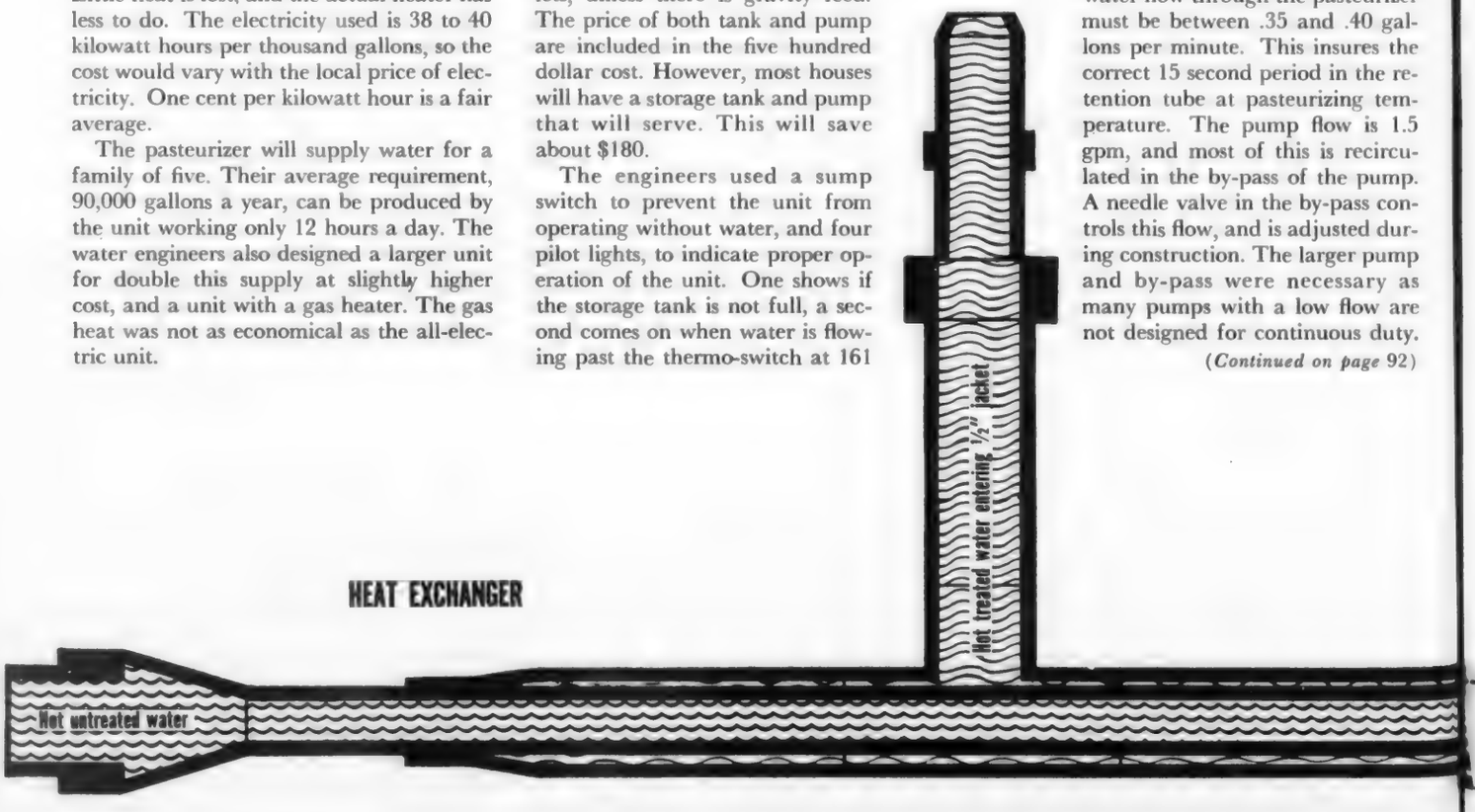


This list of actual materials used in building the unit does not mean an endorsement of the equipment by Farm Quarterly or the Public Health Service.

With one possible exception (The Bypass Pump) there are many alternatives to the brand name listed. A local dealer will help assemble the parts. Some alternatives may be more efficient, but these listed here worked satisfactorily for the test period of a year.

1. Heat Exchanger: 107 feet of ¼" K soft temper copper tube inside ½" K soft temper copper tube, 4 heat exchanger tees, and insulating box $95.00

2. Bypass Pump: Aurora Turbine Vane Pump Model B-32 complete with steel base and ¼ H.P. drip-proof motor. Aurora Pump Co., Aurora, Illinois $69.60

3. Heater: Chromalox—N. W. H. Jr. all-bronze construction, 1500-watt heating element equipped with thermostat and pilot light, with 1" pipe inlet and outlet. Edwin L. Wiegand Company, Pittsburgh, Pennsylvania $54.50

4. Air Relief Valve: Automatic hot water air valve, size ⅛"—Maid-O-Mist No. 7 Auto Vent. James B. Clow & Sons, Chicago, Illinois $6.50

5. Thermoswitch: Hex Heat Thermostatic Switch, Catalog No. 17161. Closes on temperature rise. Fenwal Incorporated, Ashland, Massachusetts $15.00

Solenoid Valve: 3-way solenoid valve, port size 3/32", Catalog No. 83147, pipe size ¼". Automatic Switch Co., Florham Park, N. J. $14.50

6. Thermometer: Western dial thermometer, range 0-200° F, divisions 2° F, ¼" pipe thread, model 2281, all-metal construction. Weston Electrical Instrument Corp., Newark, New Jersey $12.50

7. Finished Water Storage Tank: Galvanized storage tank, 511-gallon capacity, with cover. Montgomery Ward Company, Chicago, Illinois $95.00

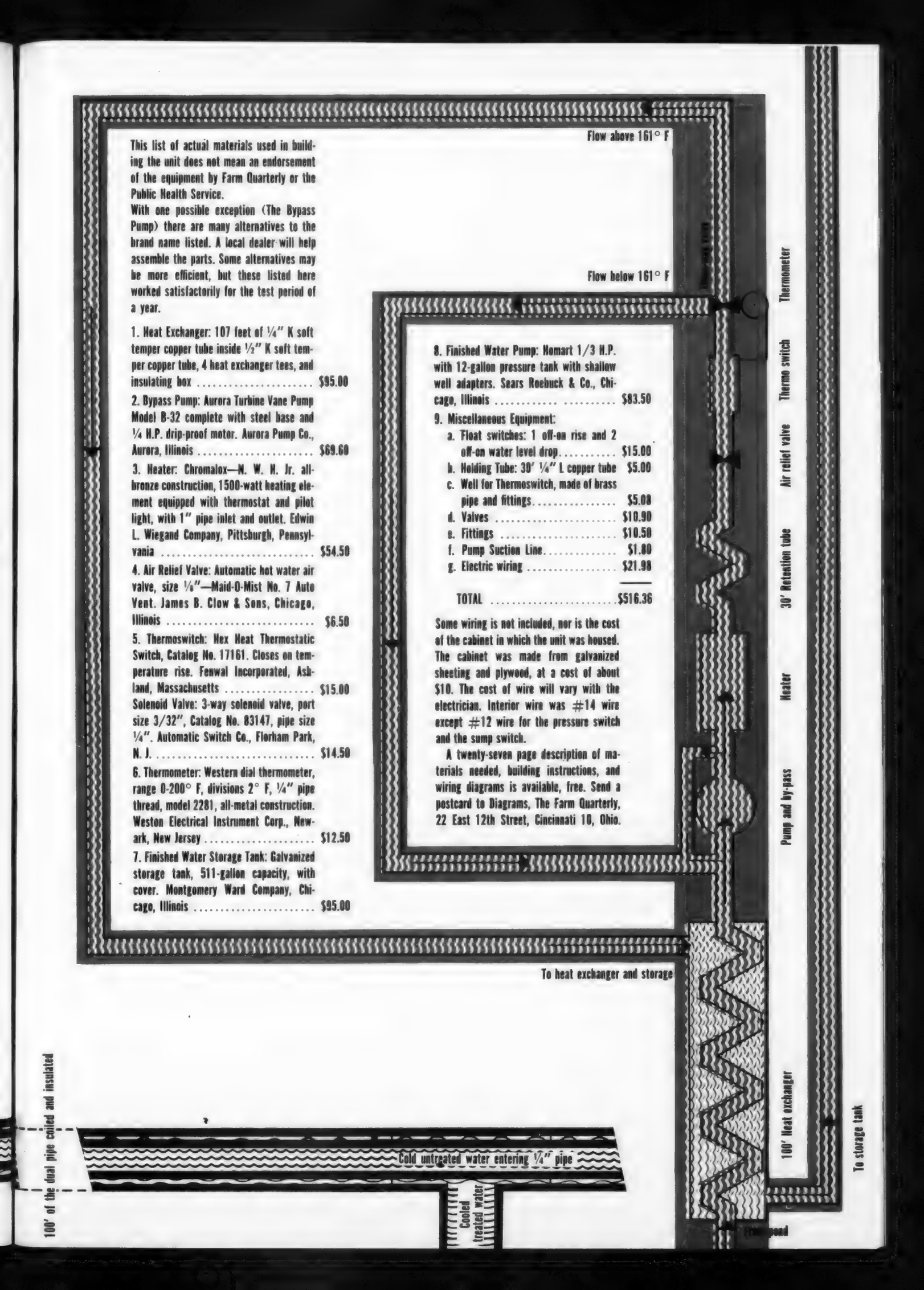
8. Finished Water Pump: Homart 1/3 H.P. with 12-gallon pressure tank with shallow well adapters. Sears Roebuck & Co., Chicago, Illinois $83.50

9. Miscellaneous Equipment:

a. Float switches: 1 off-on rise and 2 off-on water level drop	$15.00
b. Holding Tube: 30' ¼" L copper tube	$5.00
c. Well for Thermoswitch, made of brass pipe and fittings	$5.08
d. Valves	$10.90
e. Fittings	$10.58
f. Pump Suction Line	$1.80
g. Electric wiring	$21.98
TOTAL	$516.36

Some wiring is not included, nor is the cost of the cabinet in which the unit was housed. The cabinet was made from galvanized sheeting and plywood, at a cost of about $10. The cost of wire will vary with the electrician. Interior wire was #14 wire except #12 wire for the pressure switch and the sump switch.

A twenty-seven page description of materials needed, building instructions, and wiring diagrams is available, free. Send a postcard to Diagrams, The Farm Quarterly, 22 East 12th Street, Cincinnati 10, Ohio.



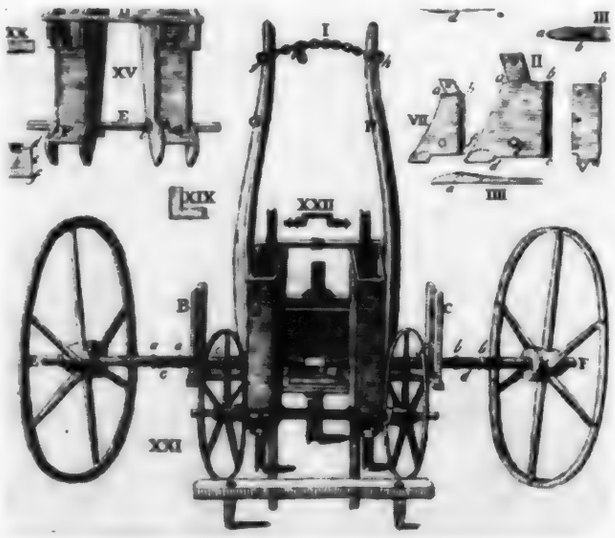
one of the great men of agriculture, JETHRO TULL, 1674-1740

By Grant Cannon

THE FARMER of 1674, when Jethro Tull was born, broke his fields with a wooden plow—sometimes shod with iron—pulled by a scrawny team of three or four oxen. Oxen were preferred because they could be eaten when they died and their steady pull was easier on the flimsy gear that harnessed them. Horses were also used, sometimes simply tied to the plow by their tails.

The plowman carried a clotting beetle, a heavy maul with which he smashed the larger, harder clods. When the plowing was done the land was further fitted by dragging branches and brush over it. A progressive farmer was one who owned a pegged harrow. Sowing was generally done by dropping the seed into the furrow at plowing, or by broadcasting it. Eight bushels of wheat or barley sown broadcast to the acre was a usual rate with a return of four to one of harvested crop over seed a good crop. In gardens seed was sown in shallow channels or dibbed—dropped into holes made by a dibbing stick.

England, at this time, was an agricultural nation of five and a half million people. Its agricultural exports were greater than industrial; the export of wheat was encouraged by a surprisingly familiar two-price system. The greatest problem, however, was the movement of any farm produce off the farm over the terrible road system. Roads, rutted to a depth of a measured four feet, were a morass of mud in the winter and almost impassable in summer. Even an Earl on the King's business, Lord Cathcart, was forced to leave his carriage and take to horse. This, too, was hazardous, for he wrote in his diary, "All went well until I arrived within three miles of Doncaster, when, suddenly my horse fell with a crash and me under him. I fancied myself crushed to death. I got on a mile further, but was then obliged to send for a Doncaster Surgeon who bled me. . . . I had another terrible fall between North Allerton and Darlington, but was not a bit the worse."



This was the world into which Jethro Tull was born. And he helped to change and improve it. He invented the drill. He also wrote a book outlining a system of agriculture which was to be known as Tullian agriculture or the New agriculture for over a hundred years.

Like Euclid whose goemetry rested on certain fundamental truths, Tull built his system of husbandry upon a set of beliefs in the nature of the soil, how plants eat, and the food they consume. Unlike Euclid's axioms which were held to be self-evident, Tull's basic theories needed to be explained, underlined, defended, argued, and reiterated. This he did in his book, *Horse-hoeing Husbandry;* or *A Treatise on the Principles of Tillage and Vegetation, wherein is taught a Method of introducing a sort of Vinyard Culture into the Corn-Fields, in order to increase their Product and diminish the Common Expense.*

Curiously enough, the fundamental ideas on which Tull built his system were quite false. Yet so well did the system work on the farm, great landowners such as Lord Cathcart, Lord Ducie and Lord Halifax followed it religiously and recommended it to others. Earl Cathcart mentions in his diary a visit to Tull's farm and of later describing the new agriculture to an interested George II. Pirated editions of the first chapters of Horse-hoeing Husbandry were printed in Ireland and translations and excerpts of the book appeared in other languages. Over a century later, Chandos Wren-Hoskyns, the agricultural historian, described Tull as, "the greatest individual improver that agriculture ever knew."

Though Tull was wrong in his fundamental concept, his very wrongness stirred his critics to search for a better answer to some of agriculture's most basic questions. One of these great questions which intrigued thinking men of the time was: what do plants eat? Tull believed he had the answer. The roots of plants, he reasoned, have lacteal mouths which ingest particles of earth so small they could only be seen through a great microscope. Such a microscope, Sir Isaac Newton, Tull's contemporary, said, would have to be of "sufficient distinctness as can represent objects five to six hundred times bigger than at a foot distance they appear to the naked eye."

From this belief, Tull argued it was the farmer's job to so plant and cultivate his fields as to create a multitude of such particles and to cause them to be pressed into the root mouths and on into the root itself, which he considered the plant's gut.

It is not surprising that Tull was wrong. No one up to this time had discovered what nourishes plants and few had even wondered. Tull and the men of his age were different from those who had gone before in their intense curiosity and their method of satisfying it—through experimentation. In Tull's cluttered bedchamber he studied his pots and glasses of mint and garlic growing in distilled and in

(*Continued on page* 140)

Jethro Tull invented the drill and revolutionized tillage and cultivation. His portrait (right) is shown through the generous cooperation of the Royal Agricultural Society of England. His original drill (above) was made from parts of an old pipe organ.

WESTAIRE

Range Fertilization From the Air

"I NEVER THOUGHT cowmen would play second fiddle to a flying machine," said D. E. Alexander, a stocky, ruddy-faced rancher of Napa, California, "but Skip Seiden with two planes spread 240 pounds of fertilizer per acre over 2000 acres of my ranch in just two days and that fertilizer is producing a lot of beef."

Alexander is one of the West Coast ranchers who has discovered heavy fertilization brings on early grass—at least two to as much as four weeks earlier than normal when the fall rains start; increases the amount of beef produced per acre; improves the quality of forage plant population; and produces an extra amount of dry feed for summer and fall use when California's annual dry season puts a stop to forage growth.

"The University of California showed us that fertilizer applied to range lands will increase grazing capacity. I've bet on their information. It has paid off three out of five years in a big way and I've broken even on the other two," Alexander continued. "The '55-'56 season was so wet we lost a lot of fertilizer through washing and leaching. This past year was too dry with practically no rain in the fall and early winter right when we needed it. But even with these two bad years, I've increased the steers on this ranch by one-third and gained around 50,000 pounds more beef than before we began fertilizing.

"I started out in a little demonstration deal with our farm advisor Irving Grover back in 1953."

The tests were run on three selected fields in the rolling hills six miles west of Napa. One field received a light treatment of 121 pounds of 11-48-0 plus 73 pounds of Urea (46 per cent nitrogen); another field received a heavy application of 129 pounds of 11-48-0 and 193 pounds of Urea; the last field was left as a control with no fertilizer. All of the fertilizer was flown onto the land.

All three fields were stocked with Hereford steers on December 8 when early fall rains had started grass growth. Stocking rate was one animal per acre and a concentrate was self-fed in addition to the grass. The results: the control group gained 1.18 pounds per day; the steers on the lightly fertilized field made 1.36 pounds gain; and the steers on the heavily fertilized ground gained 1.74 pounds. The grass, however, grew so heavily on the last field that it was necessary to add more animals on March 10, so the stocking rate was double that of the control field.

After subtracting the cost of the supplement fed the animals, Grover was able to figure the grazing income per animal day from pasture alone. This income was 8 cents a day on the control group in contrast to 18 cents a day from the steers on heavily fertilized fields. The net income after deducting the cost of fertilizer showed a profit from fertilization of $14 per acre on the high nitrogen field. The entire fertilizer cost assigned to the extra meat produced in this field gave a figure of only 10.8 cents per pound. The lightly fertilized field produced barely enough extra beef to pay the cost of the fertilizer. "High nitrogen rates would certainly be justified on this ranch," farm advisor Grover concluded, "and we have shown many more animals can be carried on fertilized range. They gain more daily and come off the range in better condition in the spring."

Alexander feels it would be unwise to give all the credit to nitrogen. "The presence of phosphorus in the fertilizer aids the development of protein in early grasses. Many tests have shown a large percentage of protein in phosphorus fertilized grasses over straight nitrogen applications.

"One test on the Frank Arata ranch in Contra Costa County," he said, "showed a protein content of 25.07 per cent in the plot fertilized with 16-20-0 as compared with 20.32 per cent in the ammonium sulphate plot (21-0-0) and 16.51 per cent on

Fast loading (left) of bulk fertilizer is the key to economical fertilization from the air. An airstrip on or near the ranch is essential. Flagmen (top) keep the pilot on a straight course. Helicopters (right and on front cover) can land and take off almost anywhere. Here they load a 'copter with sulphur for dusting grapes.

the plot which had had a heavy application of steer manure.

"But to get back to the test Grover got me to run, the results were so good that the next fall I had Skip Seiden fly on 200,000 pounds of 16-20-0 on 1000 acres. The second year I repeated on the same 1000 acres and the year after I covered another 1000 acres of the ranch. Then I skipped a year to check residual results and found the range still responding, so last fall I went all out and put 240 pounds on every open or cleared acre of the ranch. It cost me right at $15 per acre for fertilizer and application."

Coming Out Even

One aspect of the operation that amused and somewhat amazed Alexander was the fact that with a pile of 240 tons of fertilizer to be distributed, the fly-boys didn't have a pound too much or too little when they finshed the 2000 acres. At dusk on the second day of their job, one of the 450 horsepower biplanes settled down on the ranch runway—a half mile stretch of level land scraped clean—and taxied up to the loader. The pilot, Tiny Mershon, a 230-pounder, said, "One more load will cover the rest of the big long slope next to the fenceline." And there was just 1600 pounds of fertilizer left for that last run. Skip Seiden had planned it that way.

Seiden's careful planning puts the right amount of fertilizer on the ranch. He also places the fertilizer evenly on the ground. Alexander said, "I found that the fertilizer usually hits the ground right under the plane path; and if gusts of wind come along, it only carries it aside a few feet and it always comes down somewhere on the ranch where the plants can find it.

"Another thing we like about air application," Alexander said with emphasis, "is the timing. Bill Martin, a fertilizer specialist over at the University, told us that the best time to fertilize is 24 hours before the first rain in the fall. We don't have a crystal ball but we've tried to out-guess the weather by following past rainfall records and having Skip fly the fertilizer on just as close to the rainy season as we can. We've always put it on around the middle to the last of November."

You Pay for Speed

As to the cost of fertilizer application by air as compared to ground rigs, Alexander said that under his conditions of open and slightly wooded foothill rangeland, with a landing strip on the ranch, air application was not too much more than ground costs. "My costs over the past five years have averaged around 85 cents a hundred pounds, or a little over $2 an acre, for putting the fertilizer on by air. Ground rigs would have cost from $1 to $1.50 per acre. The only trouble is, you can't get ground rigs on the rough and steeper land. Steers seem to be able to get to the grass anywhere it grows so I want fertilizer all over my range, rough spots and all," Alexander said.

Figures collected by the University of California for the state show that fertilization by air averaged from 60 cents to a dollar per hundredweight or from $1.50 to $3 per acre. Ground rig costs usually run $1 an acre for applying any amount of fertilizer.

"With an airplane it all depends on the amount you want per acre," Skip Seiden explained. "It's the weight we haul that counts as we can cover an acre fast. The more you apply per acre the less the cost per pound. My rates run around 70 cents to $1 per hundredweight depending on the rate per acre and the ferrying time to and from the airstrip."

On fairly even range, Seiden's men fly the fertilizer on at 20 to 30 foot heights with the spreading spouts on the underbelly of the plane putting out a fairly even 30-foot flight swath pattern. Flagmen with white flags are stationed at each end of the run and on longer runs one is stationed in the middle to keep the pilot on the beam. The planes fly directly over the flagmen who step over 30 feet after each pass to give the pilot his bearing for the next run.

"Flagmen are usually furnished by the rancher," Seiden said, and smiled, "Their only skill is to have a three-foot pace and be able to count 10 paces and not fall asleep.

"The spreading equipment is calibrated so we can regulate the amount applied per acre to within one or two per cent deviation," Skip Seiden said, "and we can fly on either granulated, powdered, or liquid fertilizer. Most ranchers I have worked with prefer the dry, granulated type. Since you can't see the fertilizer after it hits the ground, one way we show the farmer that we are getting an even distribution is to grease a board and lay it on the ground and later show the particles of fertilizer stuck to the surface. A few such boards scattered over the area show the kind of distribution you are getting."

The men who are specializing in this new field of range fertilization from the air are using three kinds of aircraft—helicopters, single-wing planes and biplanes. Seiden uses the last two. With an 85 horsepower monoplane he seeds ranges and can carry a 250-pound load and lay down a 24-foot swath. The biplane, which he considers the perfect workhorse for the fertilizing job, has a 450-horsepower engine, carries a load of 1,600 pounds, lays a swath 30 feet wide to fertilize over one acre per minute, or up to 100 acres per hour. A lot of his range fertilization work is combined with range reseeding, the fertilizer and seed being dropped at the same time. Seiden also uses the monoplane for light seeding jobs which can be as low as two to three pounds of seed alone per acre.

Helicopters (such as the one shown on our front cover) are now being used for fertilizer application as well as for spraying and dusting. They can maneuver in tight spots where a plane would not dare fly and have been used for seeding and placing fertilizer among trees and in rough countries, such as the heads of canyons, and burned-over forest areas. Their greatest advantage is that they need no airstrip for landing or take-off.

They have two disadvantages on the side of economics. First, they can carry a load of only 500 pounds or less as compared with 1600 pounds in the biplane. Second, where Seiden's 450 horsepower biplane cost in the neighborhood of $15,000, the helicopters run around $40,000.

Because of the higher overhead and operating expenses, helicopter application rates are higher—5 cents per pound on flat country and up to 10 cents per pound in rough country.

Bulk Delivery

From his experience, D. E. Alexander says, "The key to range fertilization by air is an airstrip on the ranch. If a plane has to ferry the fertilizer from a distant strip, the costs can go way up. Another saving is to handle the fertilizer in bulk. This saves $3 to $4 a ton bagging charge and a good deal more than that in man-hours of extra labor needed to load planes from bags."

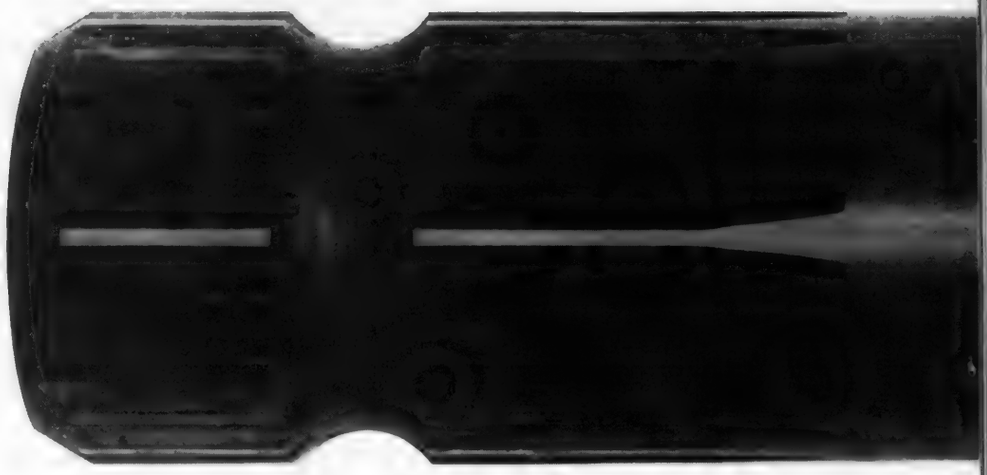
On his own job, Alexander had the fer-

(*Continued on page* 151)

Fertilizer is spread evenly from the air. To prove this, flyers lay out greased boards on which granules of fertilizer stick and tell their own story. The big planes can apply 250 pounds of fertilizer per acre at better than an acre every minute.

New PTO Speed Standard: 540 and 1000

By John MacCallum



IT WAS A LITTLE like the magician at the local fair. "Now I have one, Ladies and Gentlemen; now, I have two." Although the introduction of a second high speed pto standard wasn't quite that fast. Engineers have been discussing it for perhaps 15 years. Already it is five years since tractor and implement engineers formed a committee to study the pto requirements and revise the 540 rpm standard if necessary. They arrived at the 1,000 rpm standard, which originally was proposed to replace the lower speed.

However, at the suggestion of some of the major manufacturers it finally was adopted in December, 1957, in addition to, not in place of, the older 540 speed. So now there are two speeds, 1,000 and 540, separate and equal, on implements and tractors. An implement designed for one pto speed will not operate safely or effectively at the other. New equipment may be designed for either speed, but it should be clearly marked, and the manufacturers' recommendations should not be ignored.

Why did we need a new high-speed pto? The proponents claim pto failures are increasing and everyone agrees the pto must carry far more power today than when it was standardized, in 1923. The 36 years since have seen power requirements of pto-driven machines jump like a scared bullfrog. We are approaching the limit of power that the present 540 rpm pto 1⅜ inch shaft can carry. What is that limit? Very roughly, 75 horsepower peak, but the average must be lower, to allow for normal variations.

There are two ways to change a pto so it will safely carry more power: either use a bigger shaft, or turn the same shaft faster. The bigger shaft would be stronger, resist damage from higher torque or twisting power, more safely. It would transmit more torque, at the same speed, without breakage.

The smaller shaft, revolving faster, also transmits more power, without raising the torque. As torque is not raised, there is no danger of shaft breakage because of the increased power transmitted.

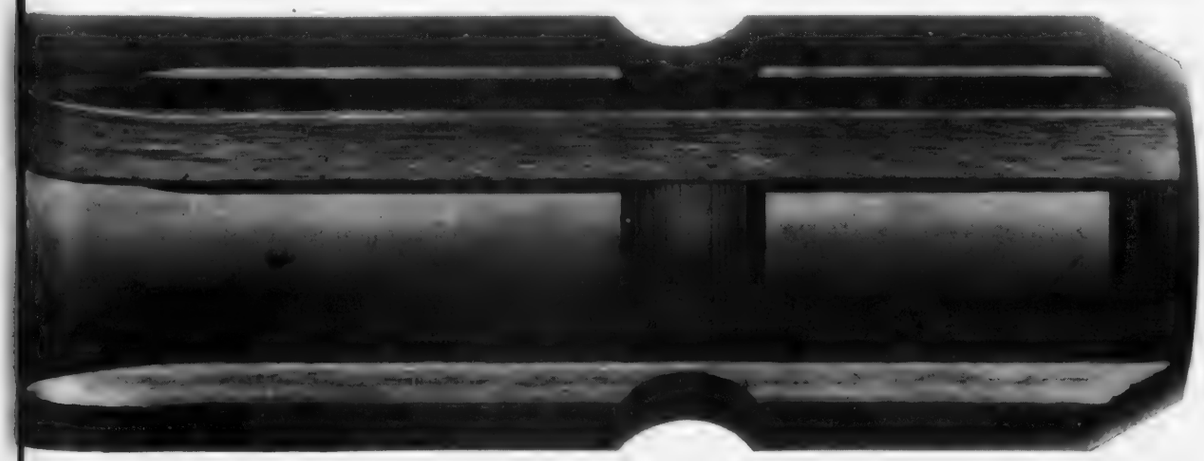
For a simple example, imagine two tractors, similar except one has 1,000 rpm pto, the other 540. Each pto drives a winch, hauling a one-ton log up a slope. The winches are the same. Suppose the 540 rpm pto hauls the logs at 10 mph. Then the 1,000 rpm pto will haul them almost twice as fast. (Actually, about 18.5 mph.) The strain on both pto shafts is almost the same—since in each case the weight of one ton of logs reaches the pto shaft through the same winch gear reduction. But the 1,000 speed would haul 85 per cent more logs an hour. Of course, it uses 85 per cent more of the tractor power in doing this.

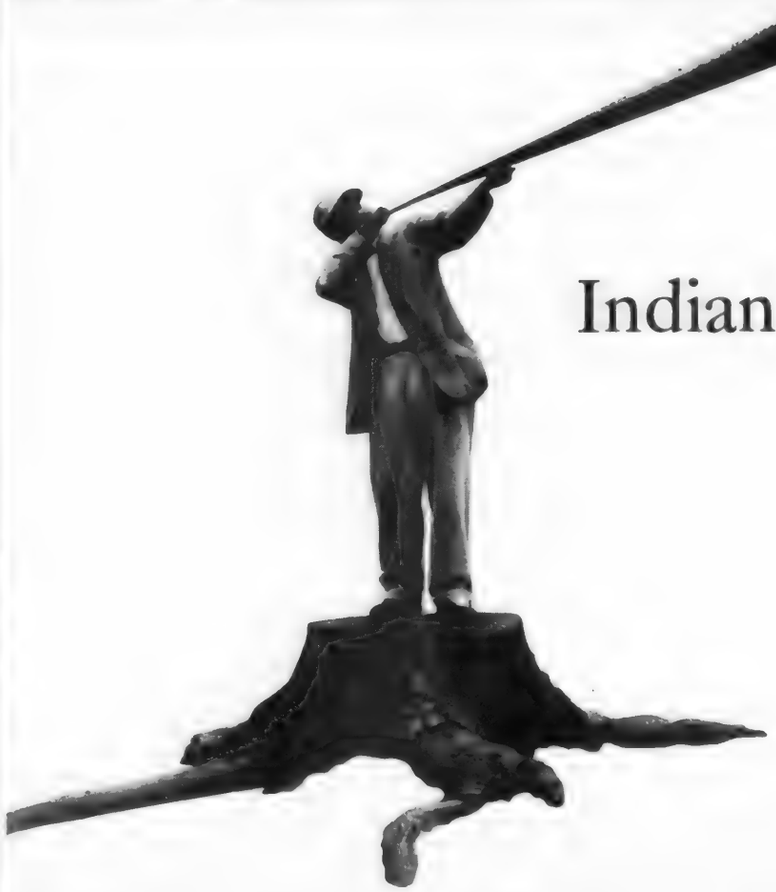
Alternatively, if the winch on the 1,000 rpm pto was geared down so it pulled logs at 10 miles per hour—the same speed as the 540 pto—it could pull an 85 per cent heavier load of logs at that speed. The torque in the pto shaft would be the same in all three cases. *The 1,000 rpm shaft will transmit 85 per cent more horsepower than the 540 rpm pto, with the same torque in the*

(*Continued on page* 126)

New PTO Speed Standard: 540 and 1,000

Before the end of 1959, most of the major tractor and implement manufacturers will have introduced machines to run at a power take-off speed of 1,000 revolutions per minute. The present line of tractors and implements, designed for 540 rpm pto, will be retained. The 1,000 rpm standard is necessary because of the power requirements of newer and bigger pto driven machinery. It will transmit 85 per cent more power through the same diameter shaft. Some other changes in dimensions and position of the shaft will make implement design simpler. In time, the 1,000 rpm standard will probably become the more common of the two. There are four basic ways a farmer can change to the 1,000 rpm standard. He can buy a new tractor with 1,000 rpm pto, and new implements to match. Secondly, if he has two tractors, he can keep one with 540, one with 1,000, and wear out his 540 implements before trading them for 1,000 implements. Thirdly, he can buy a new 1,000 tractor, and convert old machines, or convert his old tractor to 1,000 rpm. This is possible only with some models of tractors and implements. Lastly, he can buy an external gearbox for a tractor, which will allow him to use both 540 or 1,000 implements. The best choice depends on his machinery buying program. One thing he should NEVER do—drive a machine designed for 540 at 1,000 rpm.





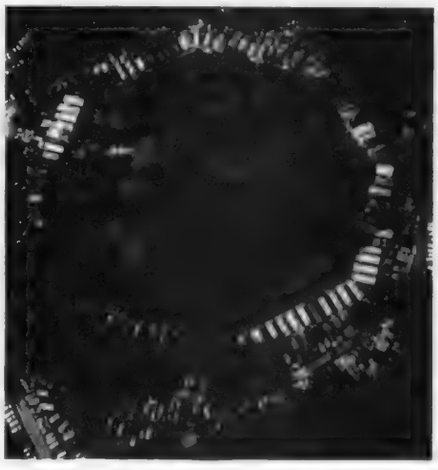
Indian Field Camp Meeting

By J. M. Eleazer

Shall we gather at the river,
Where bright angel feet have trod;
With its crystal tide forever
Flowing by the throne of God?

Yes, we'll gather at the river,
The beautiful, the beautiful river;
Gather with the saints at the river
That flows by the throne of God.

THE LAST HYMN is sung and there is a hush as the solemn words of the benediction are spoken. The crowd files slowly out of the tabernacle into the starlit night and in little knots disperse to the "tents" set in a great circle among the pines. Soon the camp fires are going, one in front of each tent; chairs are ringed around the fires and the talk begins. Families separated by time and distance gather here again, friends renew old ties. Someone brings a jug of sweet cider and a tray of doughnuts from another fire; couples wander off into the shadows, and children watch the sparks as a fresh log livens the fire.



This is Indian Field camp meeting, held each year at Indian Field camp grounds in South Carolina, begun more than 150 years ago. Many who attend today are descendants of the original families which started these religious meetings in 1800.

An institution of a by-gone age projected into our twentieth century, the Indian Field meeting has changed with the years and times. Originally a rip-snorting, hell-fire-and-brimstone religious revival, it is now more conservative and somehow more reverent. The daily life of the campers, once austere and almost primitive, is now full of fellowship and good living, for the meetings today are as much family reunions and eatfests as they are religious. Yet the original purpose of the meetings, to provide a spiritual inspiration for isolated communities, has never been forgotten. The communities are no longer backwoods, but their need for an annual religious uplift is still as genuine as it was when they started 150 years ago.

Isolated by the trackless forests and bad roads, the early settlers had only the rare itinerant preacher to bring them the word of God. God fearing men all, the promise of heaven and the penalties of sin were very real to them, and they needed more than the rare visits of the circuit rider to keep alive their zeal and devotion.

The camp meeting originated in the hills of Kentucky in Daniel Boone's time and spread rapidly north, west and south. Both the Presbyterian and the Methodist churches organized and conducted the early meetings, but other sects followed until every community was served, near or far, by an annual meeting.

Camp meeting sites were chosen with care. A grove of trees for shelter, a free-flowing spring for water, and a central point accessible to people over a wide area. The meetings were usually a week long, or from Sunday to Sunday. The worshipers came by wagon, or horseback, or on foot. They brought with them food for the week, blankets for their beds, and their long rifles for protection. They built rude shelters, made their cooking fires in the open, and slept on straw on the ground.

There were usually three services a day, a prayer service in the morning, sermons in the afternoon and evening. The sermons were interminable—often two hours long, delivered by the golden-voiced orators of the church who preached damnation for sinners, the rich rewards of Heaven for the faithful. There were shoutings and mystic seizures, and the unsaved were invited to hit the sawdust trail.

The meetings filled a great social vacuum, for in the evening after the services great bonfires were kindled, and there was visiting and talk through the night. The youngsters had a holiday, and there was romance, too, and many a young swain returned to his cabin in the wilderness with a bride courted and won at the meeting.

The institution of the camp meeting flourished all through the nineteenth century and on into the twentieth. However, as churches were built, population grew, and religious services became a weekly affair, the spiritual need for the camp meeting waned. First inspired as a religious need, they soon became as much a social institution as a religious meeting. Family reunions, recreation, and social intercourse usurped much of the religious intensity of the early meetings. The services were modernized, as the thinking of a new era relegated the "old-fashioned religion" to a dead past.

But the camp meeting had become a community and family tradition, and such traditions die hard. A few survive, among them the Indian Field meeting.

The first Indian Field meetings, from 1800 to 1838, were held on a camp ground near the Indian Field church. Demand for larger space resulted in a move to the present site, several miles away, in 1838. The grounds were incorporated in 1879.

The Indian Field meeting is held during the week ending with the first Sunday in October under the auspices of the Conference of the Methodist Church. The land is owned by South Carolina Conference, but the houses belong to the families and

The tabernacle (left) in the center of a circle of 99 "tents" (top) will seat 1200 worshipers with standing room for many more. Modern equipment includes electric lights and a public address system, but the benches are made with hand tools. A member is caught (above) in her morning chore to the outhouse in the rear of her "tent."

the owners are not interfered with as long as the buildings are kept in reasonable repair and the household conducts itself with the proper decorum. If a family ceases to use its house, it may be sold or it reverts to the Trustees. The grounds are under the management of a board of trustees.

The Indian Field camp ground is about a mile off highway 15 near St. George in a grove of the rare longleaf pines, whose needles make a soft cover over the wide circle formed by the 99 houses. These are still called "tents," a designation which dates back to the early times when temporary shelters were used. An early writer describes these "tents": "At first tents were built of pine poles with a partition through the middle and a loft above, reached by a ladder, for the gentlemen's sleeping place."

These early "tents" have been replaced by rustic two-story houses, all very much alike, with dirt floors. The front of the houses face the inner circle. A porch and an outdoor oven at the back of the house serve as a kitchen. A porch on the front is the sheltered sitting-out place; upstairs are two large sleeping rooms, one for the men and one for the women. The beds are mattresses, a modern innovation, laid on rough bunk frames. Until recent times, the campers slept on straw on the floor.

On the ground floor is the dining room-living room, a room for the servants, and a small bedroom. This small bedroom is traditionally used by the old and infirm who cannot climb the steep stairs.

There are ninety-nine houses spaced evenly around a circle a half mile in circumference. One house is owned by the Conference and is used by visiting clergy. Ninety-eight of the houses are owned by individual families and are passed down from one generation to the next. It is rare that the title to a house passes out of the family, but title can be bought and sold.

In the center of the circle stands the tabernacle, a rough structure built more than

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After the evening service fires are lit in front of the circle of "tents" and there is good talk and tall tales far into the night. The children have a picnic and youth and maid wander off among the shadows. A hungry visitor makes a midnight raid on the kitchen. Families bring their cooks along (right) and put them up in special quarters in the "tents." They take time off from the never-ending round of meals to join in the worship.

Purit

By H. Gordon Green

I Dig Pigs

You've got to be hip to sow talk if you want to be the most in pigsville.

I BELIEVE I have one of America's biggest libraries of books about pigs. Twelve years before I could afford a pig of my own, I was buying books about them. I'm still buying them. I have them in English, French, Danish and Swedish. I have books on pig economics, pig genetics, pig ailments, pig breeds, pig feeds. Some have been written by learned professors in agriculture. Some by students who will soon be learned professors. Some have been written by mysterious unnamed men of great intelligence in the government. And for all their scholarly differences, the books have this in common. They were written by pig specialists, not by pig farmers.

There is a big difference. A pig specialist has learned most of his pigology from books, and from other pig specialists. But there are certain lessons of inestimable worth which can be learned only by living with pigs themselves the whole day long, and then by sleeping with them. And by making their way of life so much a part of your own that an ordinary civilian can smell the animal husbandry in your clothes a block away against the wind.

There is, for instance, the problem of how to lift a little pig without making him squeal to high heaven. The books don't seem to take any note of the matter, but that squeal can be disastrous at times. Let us say that your sow is resting comfortably after presenting you with a lusty family of twelve. The nervousness and the birthing pains are over, and she is stretched out at your feet giving forth that peculiar music of satisfaction which sounds for all the world like a contented motor. But you notice among the little pink devils fighting over her faucets, two which are smaller and weaker than the rest. They try to get hold of a good mouthful, but always there is a big fellow nearby to root them away. You know that in a matter of hours, those two little fellows will have said goodbye to the world if you don't do something for them. So you decide to temporarily remove a few of the bigger fellows and leave the field open for the needy. If they are going to go out of this world, at least you intend to see them go with a full belly.

But you have forgotten that a pig is a pig with all his cussedness fully developed even when he is an hour old. Chances are that when you grab one of those little battlers to take him away from his mother, he will squirm, screech and fight like a child in a tantrum. Immediately his mother's motor stops purring. She jumps to her feet and whirls around to find the trouble. And her concern for the pig which is being kidnapped may lead her to trample two or three others.

How, then, do you kidnap a suckling pig? Well, gently take him by one hind leg and carry him head downward. He'll never make a sound and neither will his mother. You'll never read that in a book.

Nor will you ever read that the simple caress of a firm but gently masculine hand along a sow's breasts will often soothe her feminine neurotics as magically as if she were human. Sometimes a sow will be so nervous from her ordeal of farrowing she will refuse to lie down to nurse. In such a state she may roam around her sty, wading through her family until you feel like rushing in and hogtieing her into the proper position for motherhood. But time after time, I have approached such a sow, whispered little words of endearment to her, rubbed her lovingly along her teat line, and in no time at all she would be down on her side with her family tugging furiously at her vest buttons and her motor singing as steadily as if it had never stopped.

Now I do not claim to have made any profound or mysterious discovery in learning this. I am well aware this is not new to men who have worked with pigs over the years. But these are days when many a farmer is getting acquainted with pigs for the first time. If he is a westerner, he may be hoping that pig raising may help solve his wheat surplus woes. If he is an easterner, he may be tired of trying to please the milk inspector. So there are probably more beginners in this pig business today than ever before, and most of them start by reading the books.

But no book ever mentioned that trick of the breast rub to me. Perhaps they think that one shouldn't discuss such a topic.

Of course, mind you, it doesn't always work. A sow may exercise the inalienable right of her sex and insist upon remaining unsullied by the hand of man. And if you haven't made love to her before this time, don't expect her to reciprocate now. It's good, hard-headed business to be good to your sows at all times. A sow which is a pet is apt to make the best mother of all. In our barn the other day I caught the hired man sitting on the sow as he waited the arrival of her next piglet. He was scratching her ears and telling her it would soon be over. It's going to be a dark day on the farm when that sow finally loads into the butcher's truck, but in the meantime she's the best mother we have on the place.

Crushing

It's a serious thing, this problem of crushing, and there is as yet no sure answer for it even for the boys who raise pigs by the thousands with all the blandishments of modern science. The government surveys will tell you that about a fifth of all new born piglets will never survive their first week of life because of this peril. The farrowing crate has a goodly number of proponents and on many sows undoubtedly does a job. But there is pretty good evidence that with other sows, such a prison may lead to fretting and loss of milk. The New Zealanders have designed something a little more complicated and more costly — a farrowing house with an interior which twists like the turnings of a great snail shell. In this intricate affair, the sow can lie on only one spot and only one position and there is every inducement for her progeny to keep clear of her when she decides to lie down.

But for the present, and until such devices are available to the rest of us, a good many pig men will continue to expect their sows to do a profitable job of farrowing in the traditional box stall and

without too much help from science or the engineering geniuses.

For such an unadorned maternity ward, there is one scriptural commandment which you must not forget: *Let there be light!*

At our farm, the piglets are taken away from the mother as soon as they have untied the cords and stepped clear of the cellophane package they came in. They are taken out of the farrowing pen and allowed to dry in a cardboard box placed under a heat lamp. As they dry they make the acquaintance of the brothers and sisters they will be fighting for the next six weeks. And there they stay until the last lone straggler leaves the hatch and the mother tells us that she is finished and there are no more to come. Then, with the sow resting in the position to receive them, we turn the bunch into the pen for the first important meal.

Now the light is swung over to the place where we have cornered off the maternity stall. The design of that corner surely needs no explanation here. In the first place there is no design to it. It simply is a boarding off of a corner so the old sow can't break down the heat lamp, and so that the little pigs can move freely in and out at the bottom.

But the important part is the light. Even if the weather is so warm there is no danger of chilling, we still like that light because it is the place where the piglets will congregate when they are finished eating, and when they are beneath that light, there is no more danger of crushing. But if you leave the piglets with the sow as they come, and then try to get them to forsake her for the safety haven beneath a lamp later, you may have trouble on your hands.

Let them find that first necessary warmth beneath a light, and you have a far better chance of getting them to your safety corner later. But the books don't tell you that.

Swapping Critters

Nor do they go to any trouble to tell a man how to transplant piglets from one sow to another. You have two sows, let us say, each nursing a litter. One is a little sow you once thought a runt. She has thirteen piglets now. Over in another pen you have a sow which has taken a dozen first prizes. But she has only a half dozen pigs. (The books don't tell you why things like this happen either. But they happen.) So you think, "Well, if Nature has to be so stupid about this, I'll have to be a little smarter."

How are you going to do it? You know that while some sows are by nature so missionary minded that the latch string is always out for anyone, the most of them will bite a strange piglet in two.

My method is my own, and I must confess that sometimes it doesn't work. But what I would do in the case of the two sows I have just mentioned, would be as follows: First, remove those six favored brats from the prize sow, and take them far enough away so that when they get hungry, their squealing won't make their mother jump out of her pen to find them. And I would leave them there till they *were* hungry and their mother more than anxious to have them back.

In the meantime, I would remove one of the 13 from the runt sow, one of the highest, and put him in with the six. I now proceed to do what I can to get the smell of the six onto that

(*Continued on page* 137)

"So I rub pigs together. And here again I lose all concept of decency. I rub him thoroughly and all over. I also do not forget to rub him well behind."

"But time after time, I have approached a sow, whispered little words of endearment to her, rubbed her lovingly along her teat line, and in no time at all she would be down on her side . . . her motor singing as steadily as if it had never stopped."

One Farm Vertical Integration

These four farms produce, process, and sell direct to the consumer.

A FEW YEARS AGO an idea called vertical integration hit the broiler business. Feed manufacturers, in order to provide a constant market for their products, began to finance the growers. Almost immediately they took the next step and began to control production and markets. Next they found themselves in the processing and distribution end of the business and, reaching back on the other end of the line, they got into the hatchery business to assure themselves of a constant supply of quality chicks.

Integration spread from broilers to hogs and has, to the consternation of many observers, been threatening to take over in other farm enterprises.

But this thing can work both ways. Years ago the farm management pioneer, Howard Doane, urged farmers to stabilize their operations through vertical diversification. This simply meant that a poultry producer, for example, instead of offering his product on the wholesale market where demand is whimsical and prices frequently unattractively low, would process his birds and sell directly to the consumer.

Vertical diversification was slow to catch on. But the integration idea has pressured many producers into taking a second look. Here we present a group of farms, located in various parts of the country in which the production of livestock, milk, fruits and vegetables has been integrated from seed supply to marketing. The impetus in each case has come from the operator himself rather than from an outside source. One of the cases is of a retailer who branched out into farming to supply his stores.

Work Milk

Jim Work wasn't sure that he could get the customers to do their milk buying on a "Will Call" basis when he opened his farm sales room in 1955. They did! In fact he is now expanding into sausages and pork products to supplement his line of milk, poultry and eggs.

Like many a farmer, Jim Work didn't pick his market. That was done by his great-grandfather over 100 years ago. If he had, he likely wouldn't have picked Fayette County, Pennsylvania, which now has the highest per capita unemployment in the country.

But in farming, as in any other business, the right man has a habit of coming along at the right time. Jim Work had the idea that if he could put the family farm on a

Jim Work and Julius Spitzler, a packer, stand in the midst of Work's newest integrated enterprise, hams and sausages.

program of producing, processing and selling milk in gallon containers at the farm it would make it possible for consumers to save money on their milk bill and still turn in a better profit for the farm.

Jim Work's acquaintance with milk cows dates back to the time when he was eight years old and he took charge of milking the family cow. The family farm was just north of Uniontown, Pennsylvania. Beef cattle, sheep and hogs were the money makers then. His four years at Ag School at State College were spent in specializing in Animal Husbandry. After a stretch in the Navy, he came back to the farm and drove the 26 miles daily to the University of West Virginia where he worked on a Master's in Farm Management and Agricultural Economics. By the time Jim was ready to put his full time into farming his father, Emerson, had bought additional land and there was a total of 775 acres in the home farm. Herefords, Hampshire hogs and Shropshire sheep were expanding in number.

"The milk market looked good," says Jim Work. "It was $6 a hundred then. So I started a Holstein herd in 1949. This gave me a cash monthly income; you need that when you get married!"

More land and more feed were needed by this young man in a hurry. He added a farm in '49 and another in 1952, and for something that was strictly his own enterprise, he started a feed store with a hired employee in 1950. His thought was that this was one way to cut the costs of the big farm's feed, supplement, mineral and fertilizer bill.

By 1955 Jim Work's 25 Holstein milkers were producing right at 25,000 pounds a month. But the milk price had slipped! From where he sat it seemed there was only one thing to do—expand the operation. So the family council, Emerson Work as the senior partner, his wife the treasurer and bookkeeper, and Jim as the farm manager, took the big step and bought a dairy farm on well-traveled McClellandtown road, just two miles south of the center of Uniontown. This, they decided, was the spot for the dairy, processing plant and retail store. The deal was closed on Jim's 28th birthday, the 29th of March, 1955.

Cash customers can stand at an observation window and see the cows milked and the milk flow through the glass pipeline to the pasteurizer and cooler without exposure to air.

By September he was ready to open the farm retail store, selling pasteurized, homogenized milk to customers who bought their own glass jugs. To start them out the farm sells a large-mouth jug in one-half gallon and gallon sizes.

To get in the farm milk business in Pennsylvania required some doing. The first thing Jim Work did was to remodel the dairy barn on the new farm. A De Laval C.I.P. pipeline milker with glass milk pipe was installed circling the whole milking barn. The cost was $6,000. The loafing barn area had 6,000 square feet under roof added to it. That was another $6,000. The milk plant for processing and holding the milk was equipped with a De Laval vacuum tank, a Cherry-Burrell 300-gallon pasteurizer, homogenizer, and plate cooler. Then a 300-gallon De Laval holding tank was put on high legs so the milk would flow by gravity into the sales room. The cost of this with the utilities (gas, water and electricity) brought in was $16,000. This figure was kept low because much of the equipment was used. The sales room and its refrigeration equipment cost $4,000. The cow herd has increased to over 100.

So what are the economics of producing, processing and selling milk at the farm? In the Uniontown area 4 per cent milk sold at $4.47 a hundred in August this year, with the hauling extra and paid by the farmer. The Work farm pasteurized milk sold at 80 cents a gallon "white" and 95 cents with chocolate added to the whole milk. That brought the average gross return for 100 pounds to $9.30 at the farm.

The costs of producing the 100 pounds of milk work out like this:

Feed	$1.88
Labor	1.30
Depreciation on cows	1.00
Manufacturing and sales cost	.90
Cost	$5.08

That cost subtracted from the selling price gives a net of $4.22. But this also must take care of part of the total interest on the investment in the farm and also the management, which in this case is the owners. But it does open the door on the profit possibilities for a dairy farm. The Works plan to install an ice cream plant and also a full line of dairy products: cottage cheese, butter and cream as they go along.

This summer the farm store is moving an average of 300 gallons of milk a day. To have additional farm products for the good customer flow into the store from the surrounding area the Works have added fryers, broilers and turkeys to the line. From September to May they carry pork products processed from their own hogs by the local packer and master bologna and sausage maker, Julius Spitzler. This year the average sale per customer has been running right at $2.50.

What comes next on this big farm growing bigger? Just recently the Works leased five farms, about 800 acres, from the Bortz family near them. Here they are expanding the beef operation; on another farm hogs will be handled on a confined basis.

The award as one of the two Pennsylvania Young Farmers of the Year didn't come to Jim Work without due reason in 1958.

O'Neill Fed Beef

In California's San Joaquin Valley, O'Neill Fed Beef tempts the shopping housewife, the family at a restaurant, and the salesman having an expense-account steak at the hotel. Why O'Neill Fed Beef more than any other good steer meat? Because J. E. O'Neill, a quiet, grey-haired, farmer-businessman from Fresno, has gone to considerable expense to educate the Valley residents about quality beef. They know, if they lis-

ten to his TV advertising, all about the steers he feeds; their happy, care-free months on the range; their nutrient packed days in the feedlot; and the uniformly tender, flavorful, quality meat they produce.

O'Neill Fed Beef is not totally integrated —he buys the young stock from other ranchers. "Our land and water costs are too high to carry cow and calf herds. We have natural pasture only during the winter months and the cost of summer feeding or making irrigated pasture for a cow-calf herd would be just too expensive. We find it better to buy our young stuff from Wyoming, Arizona and the other range States."

O'Neill went into beef in 1938 when he gave up sheep because of the problem of getting competent help. He needed a feeder animal to clean up the roughage he produced on his 5,000-acre irrigated farm in western Fresno County. From his large cotton crop he was getting back hulls and cotton seed meal; from his alfalfa seed crop he had a large tonnage of alfalfa seed straw as a by-product and he also had alfalfa and feedable straw and grain from his barley crop.

During the war years when everyone wanted good quality beef and no one seemed to have it, O'Neill got the idea for his present vertical program which was to take him into the marketing of his product. He waited until the price ceilings and marketing quotas ended before he took the plunge. He started with a sale of 500 carcasses the first year and has grown to 12,000. His gross is $3,000,000.

Of first consideration is the product. O'Neill aims at producing a uniform carcass which grades U.S. Choice. He felt there was a quality market for such beef and he has found that market in individual retail stores, restaurants, and hotels throughout the San Joaquin Valley. He also has a few customers in Hawaii. As he has built up this market he has launched into the frozen foods market with a package deal of home freezers and the foods that go in them—with O'Neill Fed Beef prominent among the latter—which he calls Food For Better Living.

The product and the control of its quality dominate every aspect of the program from buying to butchering. O'Neill buys cattle every month of the year at an average rate of 1,000 head a month. The average, however, is somewhat deceptive. Heaviest buying comes in the fall when he is after lighter animals, around 600 pounds, to carry through the winter months when his 9,000 acre ranch in eastern Fresno County has a good grass cover. In the spring these animals are funnelled through his feedlot on the farm on the western side of the County. This feedlot has a capacity of 5,000 head. O'Neill usually keeps from 3,500 to 4,000 head in the lot for a period of from 100 to 150 days per head. The flow is roughly 1,000 head in and 1,000 head out of the yard every month. During spring and summer, some of them come from the ranch; at other times they are purchased at around 800 pounds to go right to the dry lot. Whether they are bought for the ranch or for the yards every animal must be capable of producing a choice carcass. If there is any doubt, they are culled and sold.

In the summer of 1958, a fire at the feedlot destroyed the feed-mixing center and machinery. This gave O'Neill a chance to modernize and concentrate the operation. The new set-up consists of storage tanks capable of holding 100 tons of cotton seed meal; 5000 tons of barley; and loose storage for 1000 tons of cotton seed hulls; 3000 tons of alfalfa, barley straw, and alfalfa seed straw. The feed-mixing center produces 100 tons of feed a day.

This is not a single uniform feed; a 25 per cent protein feed is mixed for the cattle newly brought into the yard and the protein content is increased as they are finished and ready for slaughter. In all, 10 different

O'Neill Beef and the government grade are stamped on every carcass (right) which comes from J. E. O'Neill's feedlot (below). The feedlot holds 5,000 head of steers many of which come from O'Neill's ranch.

feeds of different protein content are produced in the feed center each day and fed, by auger wagon, to the cattle according to their state of finish. O'Neill feeds an average of 65 tons a day. He figures it costs him 25 cents to put on a pound of beef at today's prices.

Every working day, some 50 steers take the last ride from the feedlot to Fresno 25 miles away. Here they are put through the Sierra Meat Co. slaughter house and packing plant where they are killed and the carcasses stored in the cold rooms. "The meat," J. E. O'Neill said, "doesn't have to be hauled from one place to another out in the hot air. It goes directly from the rails of the slaughter house onto the hooks in the cold storage space which is allotted to us. We also prepare the carcass for delivery right here—the retail stores take sides; the restaurants and hotels call for chucks, rounds, loins, and ribs; and the carcass is completely fabricated into small cuts and boned roasts for the frozen food trade.

"In figuring our slaughter costs and the return for the hide and other by-products," O'Neill continued, "we figure on about a seven dollar return per animal over the cost of slaughter at today's prices."

No consumer business can survive today without advertising. "We do most of our advertising through television here in the Valley," O'Neill said, "but we also encourage our customers to feature our meat under its brand name, O'Neill Fed Beef, and this is perhaps our best advertising because the customer makes an immediate association between good beef and the name. I feel that anyone going into an integrated operation which reaches the consumer must list advertising as part of the operating budget. I would say that a minimum figure for advertising should be not less than one per cent of the gross sales."

After a decade of moving beef from the western range to the kitchen range, O'Neill comments, "There is no particularly good time to get into an operation of this kind—you get in when you can and when you think you have a market. With us, market fluctuations aren't too important. We don't own a cow herd, so we're more or less in the same position as the butcher shop. When you have to buy high, you sell high; and when you sell low you are replacing that meat with lower-cost animals.

"One thing it takes, however, is money and the bigger the operation, the more money it takes. You can have accounts receivable amounting to ten per cent of your gross—so you see you can have a lot of your funds tied up in just this way.

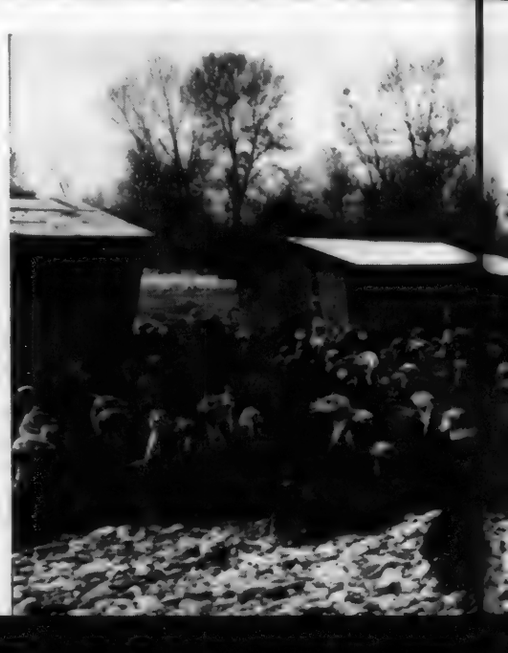
"But your returns should be greater, too," O'Neill concluded, "if you are operating on a business-like basis every part of the operation—range feeding, feedlot, butchering, and retailing—should pay for itself and return a profit and the profit from four or five enterprises sure beats the profit from but one of them."

Rawl's Fruits and Vegetables

Walter Rawl, Gilbert, South Carolina, has a sure-fire success formula for farm integration—seven children and a wife, all working on his 1100-acre peach and vegetable farm twenty miles out of Columbia. He produces 40,000 bushels of peaches and thousands of cases of fresh and canned okra, sweet potatoes, collards, and tomatoes every year. His peaches are sorted, cooled, and packed and shipped by refrigerator truck to the north and east and to local markets in three states. His collards are famous in New York, and his canned tomatoes, peaches, okra and soup vegetables are stock items in most high-class grocery stores in the Carolinas, Alabama, and Georgia. He grows his own seed and sells millions of tomato and sweet potato plants from 2 acres of hot beds. The peaches and vegetables that he can't sell fresh are canned. "I don't raise anything I can't can," he says.

Walter Rawl started an integrated farm

Dial Rawl (below) supervises an orchard crew. Peaches they can't sell fresh, they can and sell through grocery stores.



operation thirty years before the word became part of our everyday vocabulary. In 1923, before he owned an acre of land, and his total capital assets were a second-grade mule and a spring wagon, he tried his first integrated venture. Living on his father's farm twenty miles out of Columbia, he drove the mule to the city three times a week with a load of vegetables. Here is his unadorned account of his first step in integration: "I'm 20 miles from Columbia. When I was 13 years old my dad and mother truck farmed. I drove a mule and wagon from here to Columbia by myself 2 to 3 times a week during the summer. That's the way I started. Then I bought my farm adjoining them. Of course, I rented this land before I bought it. That was before I got married. Then I went into Columbia one day with a load of tomatoes and couldn't sell them. A customer, Ben Davis, said, 'Why don't you can these tomatoes and sell them in the winter time?' I said, 'I couldn't sell them if I canned them.' 'Yes, you can,' he said. 'I'll buy 25 dozen from you at $1.50 a dozen.' That's when we were packing them in quart cans. I went up to Ben Kirkland's and bought me a hand sealer and some No. 3 cans that same day. Came back home and my wife and I scalded them in a wash pot and cooked them in a wash pot, and canned them. I'll say 10 dozen the first day. Sent a sample back to Davis and he liked it. He doubled his order. So that gave me a shot in the arm, and that's the way I started."

The soil is thin in Lexington County, and his father's small farm was not up to supporting two families. Walter Rawl wanted to get out on his own, but when he went to a neighbor for a share-crop he was turned down. The neighbor, whose peaches Rawl now custom-packs, required his share croppers to have more assets than an off-grade mule and a rickety spring wagon.

But Rawl was not to be denied his place in the Carolina sun. He found an angel in a man who was willing to give him title to 60 worn-out acres for a down payment of $25. He put in a crop of collards, okra and tomatoes and what he couldn't sell fresh he canned. The next year, with his expanding credit, he added to his acreage, bought bigger kettles and bigger sealers for his canning operation and hired some help. Since that time, 36 years ago, he has never failed to add to his holdings, 20 acres here, 100 acres there, until today he owns 1100 acres. This acreage is scattered over an area of roughly seven miles.

In expanding from wash pot canning and 60 thin acres to a modern packing and canning plant and 1100 productive acres, Walter Rawl's operation has been inte-

(*Continued on page* 134)

Farmers can turn retailers and stores can become farmers. Albertson's Inc., of Idaho, bought land and are raising poultry for their meat counters. Their packing plant (above) is one of the most modern in the country; their turkey flock (left) is finished on a glacial gravel range.

THE GREAT BALLOON ASCENSION

By R. J. McGinnis

THE COUNTRY FAIR I attended as a boy had more excitement to the square inch than anything I have seen since, not even excepting the Battle of the Marne and the Century of Progress. And the thrill of thrills at our country fair was a hot air balloon ascension.

I doubt if anybody less than a grandfather has seen a genuine hot air balloon ascension, which is a pity, for as that great canvas monster shot skyward, we went with it in spirit, out into the great blue yonder. It overshadowed everything else at the fair, the horse-pulling contest, the cotton candy, the pink lemonade, even the devilish peep show (which I discovered by listening to the scandalized whisperings of my elders) and the dog-faced boy.

The balloon ascension took place every afternoon at four o'clock, and people who couldn't make the fair for anything else usually came for that event.

To see a man fly through the air touched that ancient yearning which had caused the Greeks to spin the myth of Icarus with his waxen wings. It was this same yearning which drove da Vinci to draw plans for a flying machine and Roger Bacon to theorize that a copper sphere filled with liquid fire would lift a man off the ground.

The first to produce a man-carrying balloon were the brothers Jacques and Joseph Montgolfier, of France. Their hot air balloon carried a man aloft over Paris in 1783. They had previously sent up a trial balloon carrying a rooster, a sheep and a duck. It landed safely except for the rooster, which was kicked by the sheep. The first ascent in this country was in Philadelphia in 1793. George Washington and other notables saw the flight, made by a daring young man named Francois Blanchard.

I knew little of this history when I was a boy and our balloonist had no fancy name like Montgolfier or Francois. He was probably a blacksmith or a barber during the off-season, but to me he was a superman. He walked around the fairgrounds like a god and people hung on his words. Next to being a watermelon taster, I thought possibly I might go into the balloon business.

His property and paraphernalia were simple. A balloon of light canvas, perhaps 30 feet in diameter, grimy and much patched; a rope for hoisting the balloon over the fire-pit, a parachute, and a simple swing-like trapeze beneath the parachute.

A rope was stretched between two tall trees on the fairgrounds, and the balloon was suspended from this rope by a simple arrangement which allowed it to release itself when it ascended. The open end of the balloon was immediately over a firepit. The firepit was a rough trench 10 or 12 feet long covered with old metal roofing and six inches or so of earth. A crude chimney made also of metal roofing projected into the open end of the balloon.

As the time for the ascension neared, the balloonist appeared from somewhere with a train of small boys. Some of the boys were proudly carrying buckets of kerosene, a menial job which the balloonist disdained. In this procession also were a dozen men engaged beforehand to man the guy ropes which held the balloon away from the flame and also secured it until the moment of take-off. They were solemn and dignified, properly conscious of the trust placed in them. The balloonist stationed the men around the balloon (at the ropes) and gave each a few words of instruction.

Beside the firepit was a pile of old barrel staves and scrap lumber. The balloonist stacked a heap of the kindling in the firepit and threw a bucket of kerosene over it. Then with a majestic gesture he balled up a newspaper, backed off about ten feet, lit the paper, and threw it into the pit. There was a soft explosion as the kerosene ignited and the kindling started to burn with a crackle and a roar. The balloon began to bulge out with the hot air; the balloonist kept feeding the kindling to the fire, adding a canful of kerosene from time to time to keep it going briskly. Soon he was black with soot and sweat, and looked not unlike a hard-working devil as he climbed back and forth out of the hot pit.

When the balloon was almost full and had begun to strain at the guy ropes, the balloonist paused long enough to adjust the ropes which were suspended from the bottom ring of the balloon, and to secure his parachute very carefully to these ropes. A trip rope to release the parachute was tied loosely to the trapeze bar. Finally the big moment arrived. The balloon was entirely full now. Smoke seeped from its seams and it heaved and lunged against the ropes like a captive monster. The balloonist donned a red satin jacket which he unwrapped from a newspaper, seated himself on the trapeze bar, grasped the two ropes, and backed away so that the parachute was stretched free of the ground. He held up his hand for silence, which was quite unnecessary, because everyone was holding his breath and you could have heard a pin drop a hundred yards away. Here a man was defying death right before their very eyes. He warned everybody to stand back. Those in the front rows pressed backward. "Now," he shouted, "when I count three, let 'er go." He paused dramatically, "One . . . two . . . three!" With that the anchor ropes were cast free, the balloon shot skyward with a tremendous rush, and the balloonist was jerked upward into the air. The balloon ascended straight up for several hundred feet; then it was caught by the prevailing breeze and began to drift slowly and majestically toward the east, growing smaller and smaller. The tiny figure, suspended by invisible lines below the parachute, seemed lonely and somewhat doomed.

The crowd stood frozen and silent; every eye was glued on the balloon; every mouth was open. When the balloon had shrunk to the size of our outhouse, the speck beneath was seen to wave. The parachute dropped

free, bellied out, and floated earthward. It was almost as large as the balloon, and the crowd watched its swaying descent until it vanished among the trees on a distant hillside. As soon as the parachute was released, the balloon turned over; spewing black smoke, it finally collapsed, plummeting straight down to the ground.

Someone hired for the purpose was standing by with a spring wagon and a team of fast horses. As soon as the driver had determined the approximate place of landing he galloped his team through the fairground gates, and set out to find the balloonist and the balloon. I hung around the gates for hours one afternoon waiting to see his return. Finally the spring wagon emerged from a cloud of dust in the distance. The balloonist was sitting on the folded balloon, smoking a cigar, looking tired and bored, and not very romantic. I concluded one got that way going up in a balloon, day after day.

One balloonist took his wife up with him, and another suspended a monkey in a small parachute below his own. This innovation was short-lived, as the monkey was hard to find. One lucky monkey came down in a tree covered with wild grapes, not quite ripe, and was sick for several days, missing his performance.

After the season, barring accident, the balloonist went back to his barbering or blacksmithing. But barber or blacksmith, the balloonist was a man of courage and daring. It took a lot of nerve to jump into space with a home-made parachute over unknown countryside.

End

LEPTOSPIROSIS
shoot to kill

REMEMBER THE STORY of the blind men and the elephant? One of them encountered the beast broadside and came to the conclusion it must be some kind of a huge rubbery wall. The second got his hand on the elephant's trunk and thought this strange creature was an animated firehose. And the third, who grabbed the tail, was convinced he'd caught himself a snake.

So it is with leptospirosis (lepto for short). While we have made considerable strides in the last few years in controlling and combatting the disease, it disguises itself in so many different symptoms it is very difficult to diagnose.

To the dairyman it may appear as "cold mastitis." The milk flow will dry up and the udder will discharge a thick, yellowish, sometimes a blood-tinged fluid, much like thick colostrum. But unlike real mastitis there is no fever in the udder and no swelling or caking. It hangs limp as the old dishrag.

The swine raiser may find his sows, particularly those in the latter part of the gestation period, in the midst of an "abortion storm."

The cattle feeder will notice that a number of his steers or heifers have suddenly gone to pieces. They have lost their appetites, have quit gaining.

And the rancher may come up with a terribly low calf crop, having been hit with the same kind of abortion storm that tripped up the swine raiser and which is also no respecter of dairy herds.

The horseman has for ages been plagued with moon blindness, periodic ophthalmia, in his stock. Veterinarians today are pretty certain this can be caused by a leptospira of one of the types that cause the damage in other livestock.

A great many infected animals show no symptoms at all or they may abort without any visible cause. Acute symptoms such as fever, jaundice, bloody urine, labored breathing and severe depressions, are comparatively rare.

Sheep and goats (though the disease is not nearly as prevalent in these species as in cattle and hogs), dogs, cats, rats, mice, skunks, deer, muskrats, in fact all mammals, are subject to the leptospiral diseases. Even man is attacked by a form known as Weil's Disease.

So what is it? In the bare language of the veterinarian's dictionary it is an infectious and contagious disease of wild and domestic animals. It attacks the liver and kidneys, causes abortion among other things, and is

Leptospirosis attacks the kidneys and liver. In this section of the kidney of a cow (right) magnified 1,100 times, the leptospirae, the bacteria which cause the disease, are the short, crooked, black lines. There are two large groups of them in the lower part of the picture. Vaccination (left) is an inexpensive and positive means of preventing the spread of this disease.

characterized by jaundice, anemia, bloody urine (more correctly, *hemoglobinuria* as it is only the red blood pigment rather than the whole blood which are passed in the urine), loss of appetite and general unthriftiness. Acute cases, particularly in young stock, often result in death.

It is certainly not a new disease. It has been around for a long time undoubtedly causing much of the trouble for which Bangs or some other infection caught the blame; and it has been found in all the major livestock-producing areas of the world. The Sudan, Egypt and parts of South Africa seem to be the only areas completely free of lepto.

We might have been much further along in our campaign against the disease had not Walter Reed discovered some 50 years ago that yellow fever is caused by a mosquito-transmitted virus. Since jaundice is a symptom of both lepto and yellow fever in man it had been thought up to that time that the leptospirae were the cause of both diseases. Once yellow fever was whipped lepto was more or less forgotten both in man and livestock.

No traces of it were found in this country in livestock until 1944; even as late as 1952 it was still looked upon as an exotic disease of little importance. Today it is estimated that losses from lepto cost the American livestock industry over $112 million per

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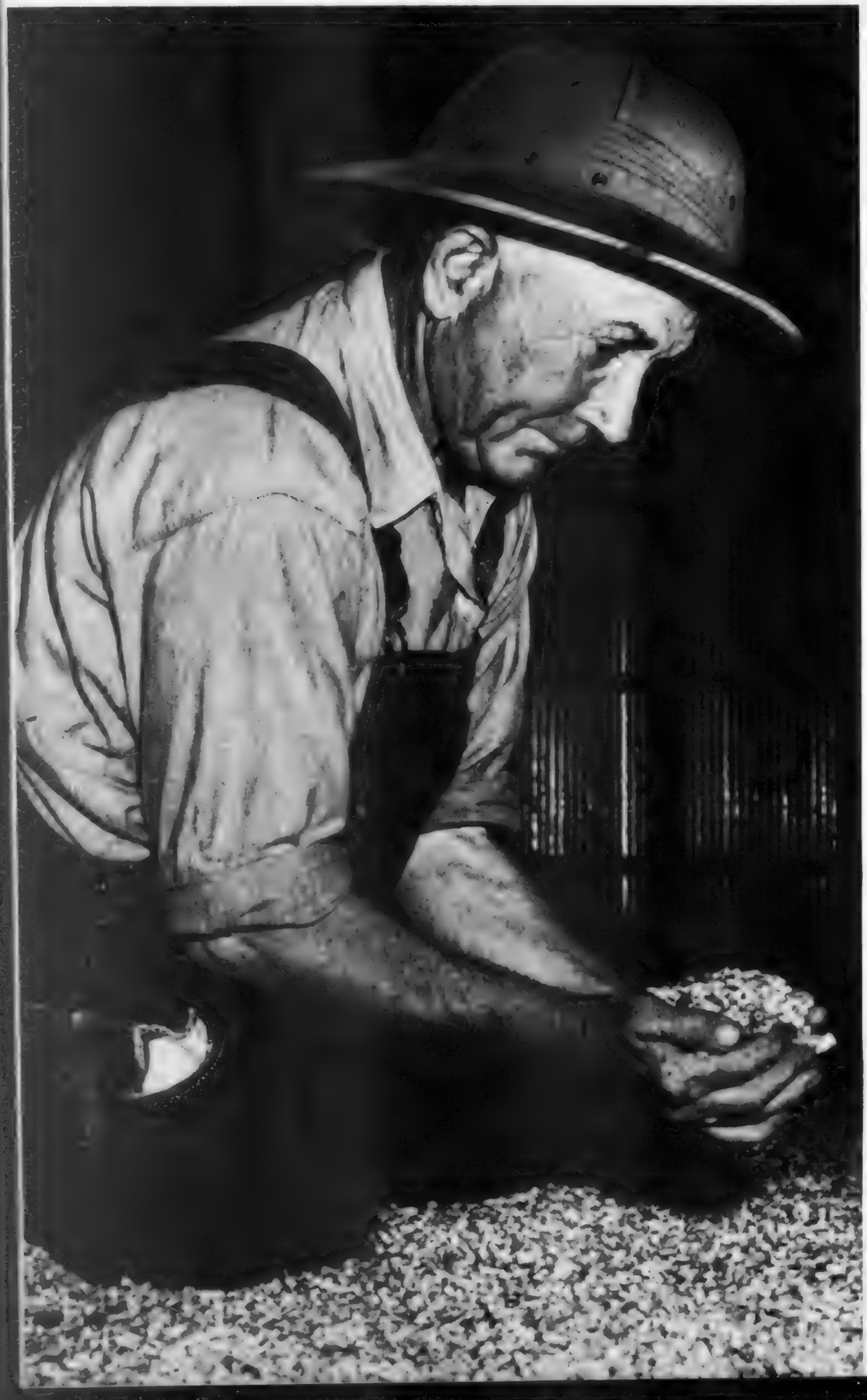
LEPTOSPIROSIS–shoot to kill

Abortion, jaundice, anemia, bloody urine, "cold mastitis," and general unthriftiness are a few of the symptoms of Leptospirosis. Fifteen years ago it was practically unknown in this country. Today it causes livestock losses running into the hundreds of millions of dollars. Diagnosis is extremely difficult, but blood tests have been developed which are quite helpful in identifying diseased and "carrier" animals. While present methods of treatment are not too successful, vaccination coupled with recommended sanitary practices is very effective in preventing the disease.

Low Cost Grain Drying

By Fred Hawthorn



"When a man sinks this deep into stored corn it's dry," says Fred Hawthorn as he scoops up a big handful to check its quality.

IT USED TO BE that when the old corn cri was about to fall down there was onl one thing to do, build a new one. But wit the coming of field shelling a new facto has entered the picture. So about two year ago when the old crib on this western Iow farm of ours was ready for the kindling pi we were faced with a major decision. I was either build a new crib or go to fie shelling and shelled corn storage.

We were aware, of course, of the advan tages offered by wet corn storage, a tech nique which was just beginning to get som publicity at that time. But with our sight set primarily on the cash market we knew we did not need to go to the expense of put ting our grain into big air-tight tanks. W were hesitant, too, about getting involve in the mechanics of heated air drying. S after much study of the research in the fiel of unheated or cold air drying, we decide that was our meat. We were convinced w could do a very efficient job this way at minimum cost for both the basic insta lation and for operation.

If wet grain is spread out thin enough natural circulation of air will keep it from heating and will eventually dry it. Un heated air drying works on this same prin ciple except that fans are used to force ai through grain piled in much deeper layers Since fan power requirements increase tre mendously with added depths, it is not considered practical to go beyond six o possibly eight feet.

The time required to dry grain depend on its moisture content, humidity and tem perature of the air and the amount of air forced through the grain. High moisture grain especially at warm temperatures, will mold if drying is delayed too long. Un heated air drying is not to be confused with grain aeration where very small quantities of air are used to keep grain already dry from going out of condition. An attempt to dry high moisture grain with a system de signed for aeration would only end in trouble.

Instead of putting up new cribs, we erected a 50 by 80 foot metal utility build ing, reserving a 36-foot section at one end for our grain drying and storage bin. A con crete trench 4 feet wide and 4 feet deep was run through the center of the bin crosswise of the building. This gave us a 50 foot long trench to serve as the main air duct of our drying system. We can use the area for general storage at any time by covering the trench with bridge planks. At each end of the trench is a fan which forces all air into the main duct.

In general there are two ways of distrib-

uting air from the main duct through a bin of grain, a perforated false floor or a lateral duct system. The false floor principle looked good but the price of 1800 square feet of perforated steel sheets and the necessary supports scared us. We investigated ducts and found that the pre-fabricated steel ducts were likewise expensive. After considering wooden ducts, we ended up by fabricating a lateral duct system out of old 55-gallon steel barrels at a total cost of $108 plus some welding rod and labor. After knocking out the ends, the barrels were cut in half lengthwise and four of these halves were welded together to form a twelve-foot duct section.

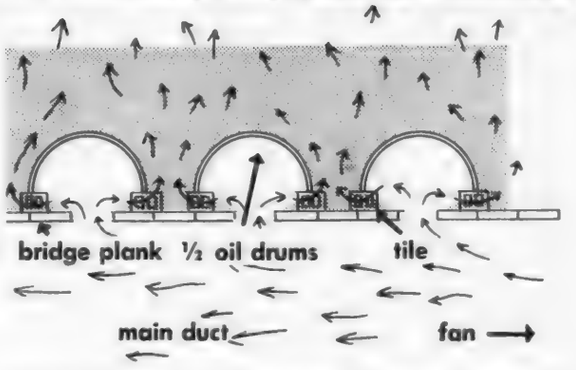
To set up for drying, every fourth plank covering the main duct is removed, leaving a one by four foot opening into the main duct. A twelve-foot section of lateral duct is placed over this opening. Two more twelve-foot sections, one placed at each end of this middle duct form one complete lateral duct across the 36 foot width of bin. Spaced on four foot centers, twelve lateral ducts are required to cover the fifty foot long bin. To provide an opening for air to escape into the grain, the lateral ducts are held off the floor five inches by tile blocks spaced every three feet. Since these ducts are not fastened down, emptying the bin is no problem. As the grain is augered out between ducts, they are quickly removed leaving a smooth concrete floor and plank-covered duct for easy cleanup. Two large louvers were installed at each end of the building for the escape of moist air.

Our building cost $5500, including labor. Since the entire building was 50 by 80, the prorated cost of the 36 by 50 grain storage section would be $2500. On a per bushel basis this figures out to 31 cents per bushel for the 8000-bushel capacity.

As was noted above, the barrels used for the air ducts cost us $108. Another $40 would cover the cost of labor involved in converting the barrels to ducts. The original 32-inch fan used for drying we had purchased used some years earlier for $75. The 5 horsepower motor to power it we bought as a reconditioned unit for $175. Later we installed a 36-inch fan of a type which lists for around $250.

First Attempt

Our first drying experience came when we discovered a 12-bushel crib of 1957 corn that still tested 21 per cent moisture in late March. Corn this wet would spoil when warm weather came, so it was shelled and dumped into a section of the drying bin. It was too cold for efficient drying so the corn was frozen by running the fan several hours. By mid-April we started operating the fan on warm days and by April 30 the corn was dried to an average of 13 per cent. The 5 horsepower motor had run a total of 78 hours at a cost of ⅔ cents per bushel for electricity.



A lateral duct system is used to distribute the air from the main duct through the bin. Hawthorn made his laterals from old oil drums cut in half lengthwise and welded end to end. They are spaced on four foot centers and supported five inches from the floor by tile blocks spaced every three feet. The main duct is four feet wide, four feet deep and can be completely covered with bridge planks when the laterals are removed.

During July, 1958, we had 12 inches of rain, making it impossible to combine dry grain. Between rains we managed to combine 4300 bushels of field certified Burnett oats that tested over 15 per cent moisture, too wet to keep in a bin. Just a few days of fan operation dried them to 12½ per cent and they completed certification with a germination of 98 per cent. We think this method of handling small grain preferable to windrowing.

The important test of our natural air system came when we dried our field shelled corn last fall. More air was needed for this job so we bought a 36-inch direct drive fan. Our original fan was only 32 inches. After finishing soybean harvest on October 8, we started field shelling with corn moisture at 22½ per cent. Our outfit did an excellent job with field losses extremely low and practically no kernel damage.

The corn was elevated directly from our dump truck and dump wagon into the drying bin. By turning the spout occasionally, the corn was well distributed over the bin with little scooping. As soon as the bin was filled level with the top of the ducts, the fans were started and run during the daytime only. When we finished harvest on October 18th, the corn in the drying bin was 5½ feet deep. Corn from the field now tested 20 per cent and our neighbors were

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Low Cost Grain Drying

When a man trades his corn picker for a corn combine or a picker-sheller his corn crib becomes obsolete. Also, in order to take full advantage of his new equipment he will want to harvest his corn earlier than he would with his picker. This means he runs smack into the problem of what to do about that extra moisture in the grain.

Fred Hawthorn decided to see what he could do with unheated air. He erected a 50x80-foot metal utility building, blocked off a 36-foot section on one end for grain drying and storage. Capacity of this space is 8000 bushel.

Two fans force the air through the home-fabricated lateral duct system and up through the grain. This system is not designed to handle grain of excessive moisture content but does a very efficient job when the moisture does not exceed 23 to 24 per cent. Hawthorn's drying costs on 6500 bushels of corn last fall were about ⅓-cent per bushel. This corn was field shelled starting with a moisture content of 22½ per cent. It was dried to 12½ per cent in 23 October days. Supplemental heat can be used when weather conditions demand.

The Care and Feeding of

WET CORN

New developments save time and labor at harvest and provide clean, rodent-free storage.

By Gerald W. Isaacs and Ira J. Ross

YOU CAN SAVE yourself a lot of time and trouble at harvest by putting your high moisture corn (23 to 30 per cent moisture content) into airtight storage; and you will sacrifice little or nothing in the feeding value of the grain.

Those who have been high on the feeding value of wet corn may be startled into a quick double-take on that one. Reports up to the last season had rather generally stressed the feeding advantages of the high moisture grain, particularly in fattening cattle. Now they are less enthusiastic.

Some feeding trials with hogs showed a slight advantage, some a slight disadvantage. There was no question the hogs found the corn extremely palatable. One feeder cautions, "Don't start your hogs on wet corn unless you're sure you have enough to finish them. You'll have an awful time trying to get them to switch to the dry stuff."

Some still claim the high moisture corn gives them at least a 15 per cent advantage over dry corn; and one eastern Indiana swine raiser who feeds 4,000 hogs a year has records to show he is putting 100 pounds of gain on his porkers with every 330 pounds of feed using a ration based upon high moisture shelled corn.

The following statements sum up the current opinion on the feeding value of high moisture corn based on trials at the Illinois, Indiana, Iowa and Ohio stations:

(a) Beef Cattle

High moisture ground ear corn seems to have a 10 to 15 per cent feeding advantage over dry corn (13.5 per cent moisture content) for fattening beef cattle. Ten to 15 per cent less corn is required to make a pound of gain. One theory is that the cattle can better utilize the high moisture cobs.

High moisture shelled corn (not over 30 per cent moisture content) is equal to dry corn in feeding for beef. At higher moisture it results in slower and less efficient gains.

(b) Swine

There seems to be some disagreement on the nutritional advantages for high moisture shelled corn when fed free choice with supplement to growing-finishing swine. Some tests even indicate the pigs put on slower gains and require more supplement per pound of gain when on wet corn. Two feeding trials started with pigs of about 100 pounds weight have shown a slight advantage in rate and cost of gain.

(c) Lambs

There are little if any differences in nutritive value between wet and dry corn in feeding lambs.

(d) Dairy Animals

Dairy heifers do not seem to utilize high moisture shelled corn any better than dry corn. While dairy cows make efficient use of wet corn, it offers no substantial advantage or disadvantage over dry corn.

Time Saver

So it is obvious that the great interest in putting up high moisture corn stems from something other than the feeding advantages it offers. That something is the big saving at harvest time plus clean, rodent-free storage.

At the Dale Fox Farm at Rigdon, Indiana, for example, they filled a 30-foot silo with 1,800 bushels of wet corn in a half day last fall with two shelled corn harvesters. An elevator was used for the filling job. And in the same neighborhood Willard Horine harvested and stored 2,000 bushels of corn a day with a corn combine. There is no bottleneck because of the limited capacity of a dryer, and no waiting until later in the fall when the corn has dried naturally but is subject to considerable field loss in picking.

F. D. Laudenslager, of Marion, Ohio, is happy about the speed with which he can fill his big 20x50-foot, center-opening silo with ground ear corn. Using a blower with a 24-inch fan and a rotary distributor to distribute the material evenly throughout the silo, he estimates he can fill at the rate of four bushels per minute. He has put ground ear corn of as high as 40 per cent moisture into the silo, though he prefers to harvest the grain at about 26 per cent moisture. He also takes dry corn which has been cribbed, wets it down with water and blows it into the silo after his original high moisture corn has been fed out.

Like others who have switched to feeding high moisture ground ear corn, he likes not only the results he is getting with his cattle but the rodent-free storage as well.

The most important considerations for the farmer at the present stage of development are how to get the corn in and out of the silo and what is needed to keep it in good condition while it is in storage. Basic to these questions is an understanding of what happens to the high moisture grain in airtight storage.

In the Silo

After the corn has been put into the silo or tank, as some call these airtight containers, it soon converts practically all of the oxygen present in the storage space to carbon dioxide by respiration. This happens within a few hours after the structure has been filled. When the oxygen is exhausted fermentation takes place. The result after several weeks of storage is a grain which has a fermented

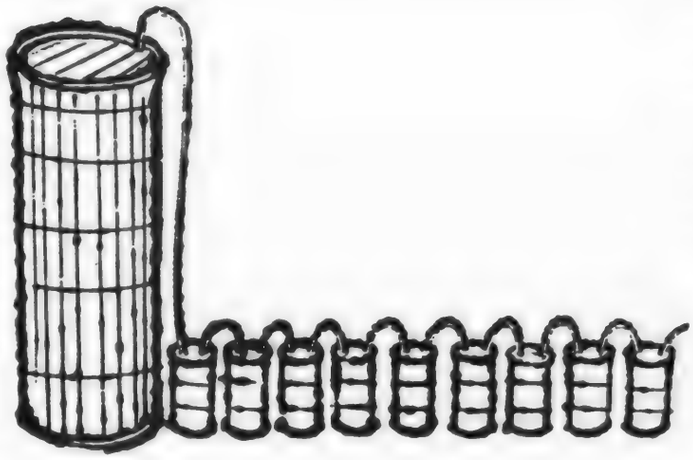
odor, a texture softer than dry corn and a somewhat darker color. It is highly palatable to livestock. But this ensiled grain loses its ability to germinate; and it is not suitable for market purposes even if dried.

Completely airtight storage is actually a tough little item to provide on a large scale. If you seal off a very large tank the air or gas in that tank will expand and contract as the temperature rises and falls. This in turn causes a rise and fall of the pressure inside the tank. Some of the time a vacuum will be created. Less than ¼ pound per square inch of vacuum may cause buckling of the walls of most large steel tanks. And from the corn storage standpoint, if there are leaks in the structure the vacuum will cause air to be drawn in. The lower the location of the leak the more damage will be caused since air is lighter than the carbon dioxide and will rise through the entire column of grain producing undesirable molds.

This makes it necessary on airtight grain storages to provide a means of venting or relieving vacuums or excessive pressures in the storage. Venting is also necessary to allow air to enter the structure to replace the grain removed. A little air introduced occasionally at the top of the storage and allowed to mix with the accumulated gases before contacting the corn does no particular harm. But when much air gets into the grain it causes molding.

All commercial structures for storing high moisture corn are provided with various devices for venting and relieving pressure. The glass-lined silos have a breather bag at the top. This bag is connected by a tube to the outside. An increase in pressure inside the silo forces the air out of the bag, allowing the gas in the storage space to expand. A decrease in pressure reverses the process, drawing air into the bag and relieving the vacuum. Within the volume limitations of the bag, the structure is maintained at essentially zero pressure and difficulty from any small leakage in the silo wall is avoided. Larger variations in pressure that cannot be

(*Continued on page* 132)



A unique experimental idea for equalizing the pressure inside the airtight silo with that of the surrounding atmosphere is shown in the diagram above. When the CO_2 in the silo expands, it descends the tube into the series of drums. When the gas in the silo contracts, CO_2, rather than air, is drawn back into the silo. Little or no feeding value is lost in high moisture corn and the ease of harvesting, storing and feeding the crop (below) is earning its enthusiastic acceptance. To prevent spoilage in the silo the outlet (opposite page) must be fitted with an airtight cap.

THE PSEUDO CORPORATION

a new farm tool which may be for you.

By Dan Henley, *Doane Agricultural Service*

NEITHER DEATH nor taxes can be forestalled by incorporating your farm, but some of the problems connected with each can be met in this way.

Until recently all corporations were double taxed—the corporation paid tax on its net profit, then when dividends were paid to the stockholders, the profit was again taxed as personal income.

In late 1958, however, Congress passed a law permitting small corporations which can meet certain strict requirements—which most farm corporations can—to elect to pass all their profits directly to the individual stockholders at the end of every year. In this way, only the stockholders, never the corporation itself, have profits, thus only the stockholders pay income taxes, and the double tax is eliminated.

Most specialists consider this choice important as it lets the small organization get around the big cost of operating as a corporation while giving it all the advantages.

For the farmer who considered incorporation in the past and gave it up because of the high taxes, the pseudo or electing corporation may be just what he has been waiting for. To state it another way, the tax advantages of the pseudo-corporation are no greater than those of an individual owner; therefore no one would go into this corporation form for tax savings alone. If you can meet the requirements, however, the pseudo-corporation does make it possible to secure the benefits of functioning as a corporation without double taxation.

Here are the requirements:

(1) Not more than 10 stockholders.
(2) All stockholders must be individuals or estates.
(3) No stockholder can be a nonresident alien.
(4) Only one class of stock.
(5) Not a member of an affiliated group of corporations.
(6) Unanimous agreement of all stockholders to pass profits to owners.
(7) Not more than 20 per cent of the total gross income can come from rents, royalties, dividends, interest, etc., nor as much as 80 per cent of gross income from outside of the United States.

The farmer or businessman who has already formed a corporation can change it to a pseudo-corporation. It could mean some tax savings to him if he has been paying a large corporation tax. At the very least, the pseudo-corporation would simplify his bookkeeping and budgeting systems by generally eliminating the need for dividends, bonuses and other means of handling profits.

He should beware, however, for there are several pitfalls and a number of kinks not yet worked out in this new law. Though they will be worked out in time, all should be investigated closely before forming this type of organization or shifting to it from a real corporation.

Forming a Pseudo-Corporation

A pseudo-corporation can only be formed after a real corporation has been formed and recognized by the state. To form a real corporation one needs a lawyer to help in the many problems of checking the state requirements; choosing a corporate name; working up a stockholders' agreement; filing the articles of incorporation and arranging for the payment of the initial fees; transferring the capital to the corporation; and electing officers and directors as provided by the by-laws and by the state law. When this has all been done, a pseudo-corporation may be formed by filing with the District Director of Internal Revenue Form 2553 and a statement of consent of each stockholder. Filing is during the first calendar month of the taxable year or during the calendar month preceding the start of the corporation's calendar year.

On Form 2553 are listed the details about the corporation which show the Internal Revenue Service the corporation meets all the requirements necessary to be classed as a pseudo-corporation.

The statement of stockholder consent must list the name and address of the corporation and of each shareholder, the number of shares of stock each owns, and the date stock was acquired. It must also include a statement that all the stockholders consent to the election of the corporation to become a pseudo-corporation and must be signed by each stockholder.

When a new stockholder buys into the corporation a similar statement of consent must be filed for that person within 30 days. It should also list the name and address of each person from whom he acquired stock.

If all the qualifications have been met, the change is made to a pseudo-corporation without further effort.

The Corporate Advantages

The advantages of a real corporation are all retained if the farmer elects to change to a pseudo-corporation. In this day of growing farm size, one of the first benefits of incorporating is the simple transfer of ownership from father to children without breaking up the farm. As long as the father retains 51 per cent or more of the stock, he maintains complete control of the farm and by willing shares of stock, rather than acres of land, he can hold the farm together as an economically sized unit for his heirs.

A second major attraction is that stockholders are not personally liable for claims made against the farm, as they would be in a partnership. A similar advantage is that the credit rating of a corporation is not affected by the financial status of the stockholders, as would be a partnership. Banks and lending agencies usually look on a corporate farm as a better risk than an individual or a partnership because of the continuity of operation.

(*Continued on page* 117)

THE PSEUDO-CORPORATION

The advantages of farm incorporation—limited liability, easy transfer of the farm to the next generation, retirement funds, sick and death benefits, workmen's compensation, easier credit arrangements, to name but a few—have long tempted farmers. The possibility of double taxation has kept many from incorporating and proved costly to some who have incorporated. Now, the law permits a farmer to incorporate and pay the taxes of an individual if the corporation can meet a few simple tests (shown in the first column at left). To form a pseudo-corporation a real corporation must first be formed. This done, it may be changed to a pseudo corporation by filing Form 2553 with the District Director of Internal Revenue during the first calendar month of the taxable year or during the calendar month preceding the start of the corporation's calendar year. There are some dangers in this new arrangement which should be studied.

What should you pay for custom work? The going rate for your community. If you don't know it or if one has not been established, these figures will help in establishing a reasonable price. The figures were collected by the Doane Agricultural Service after canvassing approximately 2,000 members of their country-wide panel. They found that rates varied widely within a state or region—those listed are averages of all panel estimates within the region. Farm conditions such as topography, field size, crop yields, etc. will influence rates materially for your farm. In some cases there were so few estimates on a given rate it had to be marked, "Not completely reliable." It is, however, the best figure available. Another source for custom rate information is your County Agent and the agricultural economics department of your state agricultural college. In the list below, rates include labor and fuel unless otherwise noted.

The Cost of Custom Work

HARVESTING

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
Corn picking	Acre	$ 6.75	$ 4.75	$ 6.00	$ 7.00	$ 8.00
Corn combining	Acre	9.00	6.25	7.50	9.25	11.50
COMBINING						
Oats, wheat	Acre	6.00	4.50	5.35	5.25	8.00
Soybeans	Acre	6.50	4.50	6.25		
Alfalfa and clover	Acre	7.00	4.75	6.00	7.75	12.00
Flax	Acre	5.00	4.00	5.00	4.50	8.00*
Lespedeza	Acre	6.00	5.00	6.50		
Fescue	Acre		5.00	5.75		8.50
Grain Sorghum	Acre		4.75	4.75	4.00	6.50
Rice	Acre			6.25		14.50
Barley	Acre	6.00	4.25	5.00	5.25	6.00
Peanuts	Ton			22.00		
Castor beans, hulling	Acre		3.75	5.25		
Dry beans, peas	Acre	10.00	5.75	6.00	7.25	11.00
CROP HANDLING						
Haul, crib corn	Bushel	.07	.05	.10		.06
Haul, small grain	Bushel	.06	.05	.08	.07	.05
Haul, dry rice	Bushel			.10		.06
Haul, sugar beets	Ton		1.50		1.00	1.75
Shell, treat, store corn	Bushel	.08	.08	.18		
Dry corn	Bushel	.13	.09	.10	.07	.10*
Shoveling corn	Hour	1.15	1.25	.85		1.25
Shelling corn	Bushel	.07	.04	.12	.06	.05*
Shell, deliver government corn	Bushel	.12	.07	.18		
Truck corn to elevator	Bushel	.07	.04	.10	.08	2.00 Ton*
Cotton picking	Cwt.		2.75	2.75	2.50	2.00
Cotton stripping	Cwt.		1.85	1.75		2.25*
Harvesting sugar beets	Ton		2.25		2.25	1.50
Blocking sugar beets	Acre		15.25		14.00	15.00
Digging potatoes	Ton	5.00*	6.00*	4.00*	6.50*	
Cutting tobacco	Acre	1.25 (hr.)	1.25 (hr.)	60.00		
Stripping tobacco	Acre	1.00 hr.*	6.00 Day*	70.00		

HAY AND SILAGE MAKING

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
FIELD CHOPPING SILAGE:						
Chopper and blower with:						
1 man, 2 wagons, 1 tractor	Hour	$10.75	$ 9.50	$ 9.25	$ 8.25	$10.50
2 men, 2 wagons, 2 tractors	Hour	14.25	11.75	12.75	11.00	15.25
2-4 men, trucks, 2 tractors	Hour	18.00	14.00	15.50		16.50
Hay, corn, sorghum, to wagons	Hour	10.00	9.25	8.25		
Upright silo filling	Ton	4.25	2.00	3.25	3.00*	4.75
Trench silo filling	Ton	3.25	1.75	2.50	2.50	3.00
Mowing hay	Acre	2.50	1.25	2.00	1.50	2.00
Mowing pasture	Acre	2.25	1.25	1.75	1.25	2.00
Raking hay	Acre	1.50	1.00	1.25	1.00	1.50
Crushing hay	Acre	3.50	1.50	2.00	1.25	2.75
PICKUP BALING						
Twine	Bale	.12	.11	.18	.13	.14
Wire	Bale	.14	.13	.20	.15	.16
Round	Bale	.11	.10	.17	.12	4.75 (Ton)
Bale loader or pull wagon	Bale	.06	.04	.05	.04	.05
Hauling bales to barn & storing	Bale	.08	.07	.08	.06	.10
Elevating hay	Bale	.02	.02	.02	.02	.01
Haying, cut, rake, stack	Ton		5.25	10.25	5.00	8.00
Haying, cut, rake, bale, store	Bale	.26	.23	.31	.31	9.50 (Ton)

PLOWING AND CULTIVATING

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
PLOWING, MOLDBOARD PLOW						
Spring	Acre	$ 4.25	$ 3.50	$ 3.50	$ 4.50	$ 4.50
Fall	Acre	4.50	3.75	3.60	4.25	4.50
Sod	Acre	5.00	4.25	4.00	5.25	5.50
Plowing, disk	Acre	3.50	2.75	3.00	2.75	4.50
One-way	Acre		2.00	2.00	2.00	2.50
Disking tandem	Acre	2.50	1.50	2.00	1.75	2.25

*Not completely reliable.

PLOWING AND CULTIVATING (continued)

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
Offset	Acre	3.00*	1.75	2.50	2.50	2.25
Disking, with harrow	Acre	3.25	1.75	2.25	2.25	2.50
HARROWING						
Spike tooth	Acre	2.00*	.75	1.20	1.00	1.00
Spring tooth	Acre	2.10	1.25	1.50	1.35	1.50
CULTIVATING						
Sweep cultivator	Acre	2.00	1.25	1.70	1.30	1.75
Rotary hoe	Acre	1.50	.85	1.40	.80	1.00*
Weeder	Acre	1.00	.85	1.60	1.25	1.40
Stalk cutter, power takeoff	Acre	2.50	1.75	1.75	1.25	1.75
Cultipacker	Acre	1.60	1.00	1.25		1.25
Pulling bush and bog	Acre	5.85	4.00	3.60		
SUMMER FALLOWING						
Rod weeder	Acre		1.10	2.20	1.10	1.00*
Graham Hoeme	Acre	3.00	2.00	2.00	1.25	2.00*
Duckfoot	Acre		1.65	1.60	1.25	1.50
Bordering	Acre		2.50		1.50*	3.00
Chiseling	Acre	4.00	4.50	4.00	2.00	7.25
Plowing, deep	Acre	4.50	4.50	5.60	5.50	5.75
Rotary tilling	Acre		4.75			8.75

PLANTING AND DRILLING

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
CORN PLANTING						
Without fertilizer	Acre	$ 2.30	$ 1.25	$ 1.80	$ 2.00	$
With fertilizer	Acre	2.75	1.75	2.25	3.00	2.00
Check row, fertilizer	Acre	3.50	2.00	2.25		
DRILLING SMALL GRAIN						
Without fertilizer	Acre	2.00	1.20	1.50	1.40	1.90
Without fertilizer, with clover seed	Acre	2.50	1.40	1.80	1.85	1.85
With fertilizer	Acre	2.30	1.60	2.00	2.00	1.90
With fertilizer and clover seed	Acre	2.50	1.75	2.50	2.50	2.50
Drilling soybeans	Acre	1.80	1.40	1.80		
Other beans	Acre	2.25	1.30	1.80	3.75	5.00*
Planting potatoes	Acre	5.00	4.00	6.00	4.50	10.00
Cotton	Acre			2.00	1.50	1.40
Sugar beets	Acre		1.50		2.20	
Seeding alfalfa, clover, etc.	Acre	2.40	1.15	1.65	1.60	2.00
Broadcast seeding	Acre	1.25	.75	1.25	.50	1.10
Tobacco setting	Acre			14.50		
Planting pine seedlings	1,000 Sdlgs.			6.50		
Sweet potato transplanting	Acre			5.25		
AIRPLANE						
Seeding legumes	Acre	2.30	2.10	1.25		1.80
Seeding small grain	Acre	1.50	1.70	1.25		1.50
Seeding rice	Acre			1.00		1.75

SPRAYING AND DUSTING

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
Spraying, all (average)	Acre	$ 3.00	$ 1.60	$ 2.30	$ 2.15	$ 2.50
Spraying weeds with 2,4-D	Acre	2.85	1.65	2.00	1.80	2.25
SPRAYING FOR CORN BORER						
Tractor outfit, including material	Acre	3.40	2.25	3.30	3.25	
Tractor outfit, no material	Acre	2.60	1.25	1.50		1.50
Aerial, no material	Acre	2.60	1.90	2.30	1.70	1.50

SPRAYING AND DUSTING (continued)

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
Spraying for spittle bug or alfalfa weevil	Acre	2.50	1.60	2.50	1.85	1.50
Spraying potatoes	Acre	3.75	2.25	2.75	3.25	2.00*
Vegetables	Acre	7.00	2.80	3.50	3.50	
Tree fruit	Acre		3.00*	3.50		
Cotton	Acre			1.50		1.50*
Spraying cattle	Head	.32	.27	.19	.28	.17
Dusting all (average)	Acre		2.00	1.50	2.50	1.25
Cotton	Acre		2.50*	1.50	3.00*	1.50*
Potatoes	Acre		2.25	1.80	3.00	2.50
Vegetables	Acre	4.90	3.40	1.75	3.25*	
AIRPLANE						
Dusting cotton	Acre		2.00	2.30	1.25*	1.75
Vegetables	Acre	4.50	4.50	2.30	3.30	3.30
Citrus	Acre			5.00		2.00*
Spraying insecticide	Acre	3.00	2.00	3.00	1.75	2.75
Defoliating cotton	Acre			2.50	5.00*	1.75
Spreading DDT granules for corn borers	Acre	2.60	1.75	2.00		

MISCELLANEOUS

Job	Basis of Charge	North East	North Central	South	Mountain	Pacific
Boring post holes	Hole	$ .22	$ .13	$ .13	$ .13	$ .16
Manure loader	Hour	4.00	3.35	3.50	3.25	4.25
SPREADING FERTILIZER						
Bulk, dry	Acre	2.00	1.00	2.00	1.30	1.40
Liquid	Acre	1.50*	1.25	2.00	1.40	1.40
Sidedressing	Acre	2.25	1.60	1.90	1.60	2.00
Airplane	Acre		1.25	1.00		1.75
Spreader rental	Acre	.75	.50	.65	.40	.40
Applying anhydrous ammonia (not including materials)	Acre	2.25	2.00	1.90	2.35	2.00
GRINDING FEED						
Corn (medium)	Cwt.	.17	.12	.26	.15	.20
Corn and cobs	Cwt.	.17	.13	.26	.16	.20
Cobs	Cwt.	.18	.19	.29	.15	.20
Oats	Cwt.	.18	.12	.25	.15	.23
Sorghum	Cwt.	.18	.12	.25	.15	.18
Barley	Cwt.	.17	.14	.25	.16	.25
Mixing feed	Cwt.	.12	.08	.15	.12	.18
Bulldozing	Hour	10.25	12.00	11.75	10.50	11.25
Machine tiling (no tile)	Rod		1.60			1.40
Trenching	Foot	.19	.30	.14	.45	.25*
Digging basements or ditches	Hour	8.50	10.00	10.00	11.50	9.00
Land leveling	Cu. Yd.	11.00 (hr.)	.25	.22	.14	.16
Land clearing	Acre	100.00	70.00	50-60.00	50.00	40-50.00
Building fence, woven wire 1 barb, no material	Mile		290.00	250.00	175.00	300.00
Sprinkler irrigation system rental	Hour	7.50	5.00	6.50		5.00*
Truck (no operator), no fuel						
1 ton or smaller	Hour	2.90	2.00	1.85	2.00	2.10
1½ ton	Hour	2.70	2.75	2.25	2.50	3.00
TRACTORS, (wheel type, no operator, no fuel)						
Large—3 bottom or more	Hour	3.50	2.40	3.00	2.35	4.00
Medium—2 bottom	Hour	2.50	1.80	2.40	1.60	2.75
Small—1 bottom	Hour	2.15	1.30	1.80	1.50	2.35
Cleaning septic tanks	Job	23.00	25.00	21.00	24.00	23.00
Swathing grain	Acre		1.30		2.00	
Sawing wood, chain saw	Hour	3.00	3.50	2.80	3.50	3.40
Pelleting feed, grinding incl.	Cwt.		.26	.28	.38	.28
Self-propelled combine	Hour	8.00	9.00	9.75	9.80	11.00

*Not completely reliable.

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Smileage on the farm

9 OUT OF 10 users say:

B.F.Goodrich farm tires are the best I've ever used!

(Based on a survey of farmers all over the country)

To find out the kind of service B.F.Goodrich farm tires give, we asked the men who have used them (photos opposite). 9 out of 10 of them reported B.F.Goodrich tires are the *best* they've ever used! They said that for all-around performance, you can't beat B.F.Goodrich farm tires—and for money-saving service, you can't beat B.F.Goodrich Smileage dealers. But don't take our word—find out for yourself. Ask *your* neighbors. Then see your nearby B.F.Goodrich Smileage dealer who is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Company, Akron 18, Ohio.*

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Cut your Crop Handling Costs, too, with this new larger, efficient PTO operated self-unloading forage box. Extra large capacity and finest quality construction. 83 in. wide inside, 16 ft. long (including cross conveyor). 72-in. sides. (Also available in 2 beater model with 48 in. sides.) Write for further information on our full line of 1959 automatic crop handling boxes. They are the finest ever in design and quality, yet low in price. Get full details now.

- **Big capacity . . . unloads one ton per minute.**
- **3 Tubular Beaters and 3 speed unloading.**
- **Front unloading for convenient operator control and open front end design.**
- **Big 16-in. diameter auger—simple positive action. Also removable for trench style silos. Auger extension optional.**

KASTEN MANUFACTURING CORPORATION
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I am interested in more information on the Forage Master Model 3-B-72 Self Unloader.

Name .....

Address .....

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INDIAN FIELD CAMP MEETING

(*Continued from page* 70)

a century ago of hand-hewn longleaf pine timbers, pegged together. The dirt floor is covered with aromatic pine needles for each annual meeting.

The day starts early, with the blowing of the ancient, six-foot, home-made trumpet that was modeled after Gabriel's mythical instrument. At 7 a. m., immediately after breakfast, it calls the people to the first meeting of the day, a prayer service. Then it calls them to preaching at 11, and again at 3:30 and 7:30 p. m. The Conference brings well-known preachers to deliver the sermons and conduct the services. The exhortations and shouting of frontier religion have given away to a more conservative and thoughtful approach. A well-trained choir leads the singing. Sermons have been shortened from an hour to half that and there is rarely a mourner's bench or "invitation."

After the evening services the people walk in meditative silence back to the campfires that flicker and beckon in a great circle in front of the tents. Here fellowship approaches a religious significance. Easy chairs from the tents are arranged around the campfire and there is good talk, tall tales, and the sympathy and understanding that comes with a common background.

THE AUTHOR: Jim Eleazer is a frequent contributor to *The Farm Quarterly*. He is Information Specialist at Clemson College, S. C., and author of "A Dutch Fork Farm Boy."

PASTEURIZED POND WATER

(*Continued from page* 60)

If you've had to drill for clean water, or boil it, or buy it or haul it, you know its value. Chemical treatment is cheaper than pasteurizing, costing two to five cents a thousand gallons not including the plant. But the pasteurizer doesn't need recharging, and you can't make a mistake and drink water that tastes like a swimming pool.

For a ten-year unit life, with electricity at one cent per kilowatt hour, this unit will give water for a total cost of a dollar per thousand gallons. Some chemical plants cost more. Safe water is cheap at any price.

NOTE: Sol Iser, 7251 Reading Road, Cincinnati 37, Ohio, will assemble, to order, the heat exchangers for these pasteurizers. The price is $90 (shipping extra).

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BUILDS THE BEST

SILO UNLOADER

The only unloader which has all 10 most-wanted features named by men who have owned silo unloaders.

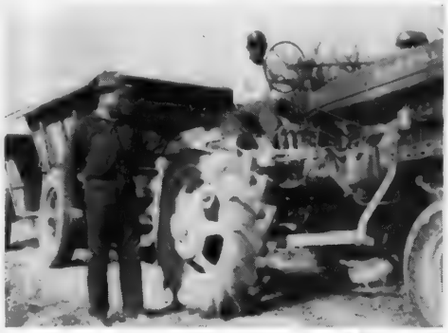
- ★ Bigger capacity
- ★ End frozen silage problem
- ★ Level cut . . . no tilt
- ★ Single cable suspension
- ★ More rugged construction
- ★ Straight-line feed
- ★ Proven and dependable
- ★ Simpler construction
- ★ No-clog blower
- ★ Fit any silo . . . fast

BRILLION IRON WORKS, INC.
Brillion, Wisc. Dept. SU-3-9

Charles Clapp, Greensboro, N. C., writes, "B.F.Goodrich Power-Grip tires give me the traction I want—something I have not found in other tires."

Don P. Stitt, uses over 100 B.F.Goodrich tires on his Williamsville, Ill., farm—reports Super Hi-Cleat tractor tires have given as much as 7 years' service before retreading!

Orville Martin, Hagerstown, Md., praises the service he gets from his dealer on the B.F.Goodrich tires on his tractors, trucks, wagons and baler.



Gillis Breaux, cane-farmer of Raceland, La., uses B.F.Goodrich Special Service tractor tires because he finds they outpull any other make and wear longer too.

Uno Freed, Essex, Iowa, writes, "When the fields get sloppy, Power-Grip traction pulls me through. I think BFG tires are the most dependable you can buy."

Art Dobson, Chandler, Ariz., finds dealer service an important reason for using B.F.Goodrich tires, says, "The outstanding feature of Power-Grip tires is long life."

B.F.Goodrich *farm tires*

160-ACRE LIMITATION

(*Continued from page* 52)

right to act as legal subdivisions of the state for the purpose of managing this most valuable of our natural resources, water, by raising funds for the development of irrigation projects and for operating them.

As a recognition of the function of the irrigation districts, the Bureau of Reclamation does not sell water direct to a private land owner. They contract with an organized irrigation district to deliver water to the canal system of the district. The district does the in-between job of distributing the water within its own lateral systems, collecting the charges for the water and policing its own contract members on compliance of the federal reclamation laws, including the 160-acre limitation clause.

A Corn Belt farmer asks, "What do you mean by 160-acre limitation?" In spite of the fact that the term, "acreage limitation," is constantly used, the limitation is on the amount of Bureau of Reclamation water or "project water," as it is called, which may be delivered; enough to irrigate 160 acres. The amount of water delivered per acre will depend on the nature of the crop and the availability of the water in the district. A rice grower will need 10 to 12 acre feet of water to mature the crop, while a barley crop may take only 2 acre feet. A farmer, in most instances, will have to pay for the amount of water used.

An irrigation district contracting to buy water from a Bureau of Reclamation project must agree it will deliver project water only to those land owners who are in compliance on the limitation. In community property states, a man and wife may each own 160 acres for a total of 320 acres and receive project water for this amount. Still another exception was in the Columbia Basin Project where Bureau of Reclamation economists established what they considered family-type units of 40, 60, or 80 acres, depending on the quality of the land, with the proviso limiting the farmer and his wife to two units.

One stipulation in the contract with land owners having excess acreage is that they may receive project water for their entire excess acreage up to a period of ten years, providing they agree to dispose of their excess land at a price to be determined by appraisal. The price must reflect the value of the land before the water became avail-

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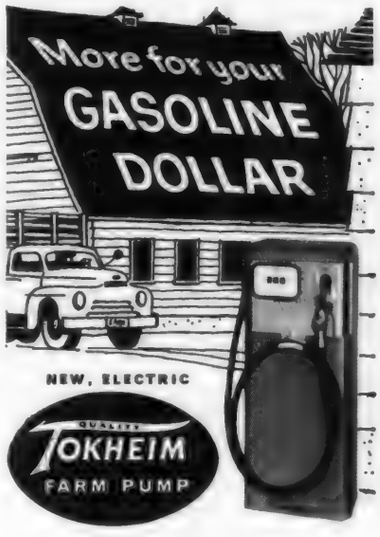

You get more for your money with an electric Tokheim Gasoline Pump. Gasoline deteriorates less when stored underground where it's cooler. It evaporates less too. Moreover with a Tokheim there's no pilferage, no spilling, no waste! Less fire risk! Easy-to-read dial. Plenty of hose. Ask your oil man or Tokheim representative. Write today for *free* booklet, "How to Install Underground Tanks".

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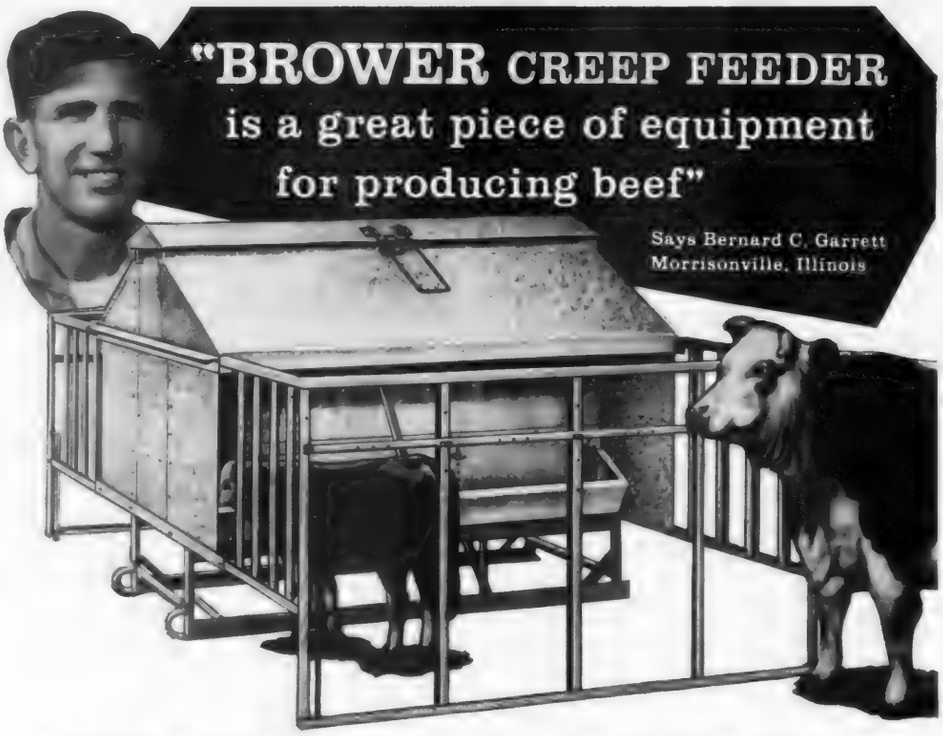

"I've had my Brower Calf Creep Feeder about 5 months. It keeps feed dry and saves me a lot of time by filling every 2 weeks or when empty instead of hand feeding twice a day. It's built strong, stands the wear. My calves are from 50 to 100 lbs. heavier at weaning and are ready for market sooner. Many farmers and livestock men have looked it over and all thought it a great piece of equipment for producing beef."

BROWER CALF CREEP FEEDER

★ KEEPS COWS OUT • SAVES FEED
★ BIG CAPACITY • SAVES TIME, WORK
★ HEAVIER WEANING WEIGHT ★ MORE PROFIT

Double stall creep feeder (above) holds 30 bushels, takes care of 40 calves; single stall creep feeder (below) holds 12 bushels, takes care of 20 calves.

Get heavier, upgraded calves at weaning . . . better price, earlier marketing with Brower's Calf Creep Feeder. Weather tight — keeps feed dry in any weather. Anchors solidly at all 4 corners — stays put. Sturdy angle iron stalls keep out larger cattle; stalls fold to top for easy towing through gates. Steel skids; hopper and trough of heavy, rust-resisting Armco Zincgrip. Shipped knocked-down to save freight; easy to assemble.

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NEW! ALL-STEEL BUNK FEEDER

At last! You can own a big capacity, fast unloading, long lasting *all-steel* bunk feeder for less than most ordinary wood-box unloaders!

Also available in rear unloader—with or without power beaters.

125 to 325 Cu. Ft. Capacities With Giant 4-Bar Beater to Every Panel

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- Full length, steel link conveyor floor.
- Completely self-cleaning, self-aligning, rust and corrosion resistant.
- Lasts longer because body is *all-steel*.
- High speed cross conveyor gives 3 to 4 ft. "gun-shot" delivery. Extension Elevator available (extra) where needed.

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able, plus any improvements.

Another arrangement in effect is that a land owner with excess land may receive project water up to the 160-acre limitation. He may secure non-project water through the irrigation district the same as any other district member without the requirement that he subdivide and sell his excess land.

The importance of the 160-acre water limitation is shown by the extensiveness of the Bureau of Reclamation's operations. Today there are approximately 26,900,000 acres under irrigation in the 17 western states. About 7,200,000, or 23 per cent of this total are served by the Bureau. One of these western states, California, has over 7,000,000 acres under irrigation at the present time, owned by 84,500 farmers. Of this total the Bureau of Reclamation is supplying water in the Central Valley, the Imperial Valley, and a few smaller valley systems, to some 375,000 acres, and is supplying supplemental water to another 900,000 acres. With the completion of the Trinity River and other proposed projects another 250,000 acres of land will be either fully or partly supplied with project water. This is fairly typical of the west.

The Opponents' Case

To state fully both sides of this question would take several books printed on asbestos. Bill Bancroft, whose fruit and nut farm gets water from the Reclamation Bureau's Contra Costa Canal System, hits some of the high points of the opponents' case when he says, "You can't regulate the economic size of a farm by government fiat. It's getting so that if a farmer succeeds he is looked upon as an evil character. My father helped organize and build the first water facilities in this valley. The big land owners put up most of the money. Now along comes the Bureau, and if these same landowners want supplemental water, they won't let them have it unless they break up their holdings. To me, this is about as screwy as telling General Motors, or Ford, how big a plant they can build, or telling a lawyer how many cases he can try.

"A good example of how silly the law is took place on the farm next to mine," Bancroft explained. "The Shadelands Ranch had to be placed in joint tenancy after the Bureau water came, so that the man and wife each own 160 acres, or a total of 320 acres. Awhile back the wife was killed in an auto accident. The husband still owned the 320 acres and was notified by the Bureau that he was in violation of the 160-acre ruling. The owner of Shadelands settled the whole matter by deeding the place to a religious group and told the Bureau they could argue with the Lord, as to whether He could have any water."

Another opponent of limitation is George Ohm of Buckton, California, who owns a 240-acre farm next to the San Joaquin River, and has pumped his irrigation water from the river since 1913. "The Bureau of Reclamation does not affect me now per-

Eric B. Beckeman, Pennsylvania-Registered Professional Engineer and owner of Beckeman Engineering Sales.

"ENGINEERED IRRIGATION STARTS RIGHT HERE"

"Applying an inch of water to a single acre requires 27,154 gallons. And, as you know, the total amount of water needed varies with the kind of crop. The average is two inches or approximately 54,000 gallons per acre every ten days from seeding through harvest.

"This imposes the most exacting demand upon the pumping equipment for dependable, trouble-free service. For example, the pump in this system operated six hours, or more, each day for 65 days during a drought. Its delivery rate is 960 gallons per minute at 120 pounds pressure. The application in a tree nursery is unusual, but it definitely shows the pump's importance.

"The proper water supply, we consider the most important factor in engineering an irrigation system. We regularly specify Gorman-Rupp Pumps because of: (1) assurance of dependable and efficient performance, (2) design advantages for the pump user, (3) adequate selection of sizes and driving power for every size of irrigation system."

SYSTEM SUMMARY
(With reference to the pump shown above.)

Crop and acreage: Nursery Stock, 75 acres.

Gorman-Rupp Irrigation Pump: Model 55M-IND56A.

Other equipment: 2,000 feet of main-line 6" aluminum pipe; 4,000 feet of 4" lateral lines, in a duplicate system; 24 sprinklers of 40 gpm in each system. Sprinkler spacing is 80 feet. Pipe spacing, 100 feet.

Date installed: June 15, 1957.

Other details on request.

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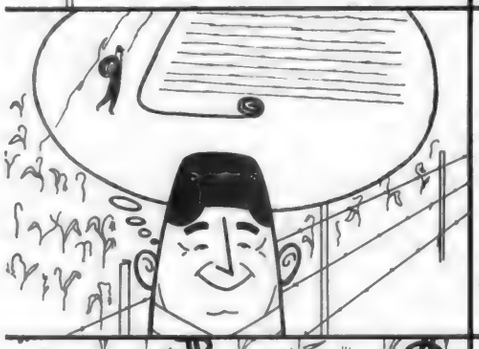
Johnny Brown's crops were a sick-looking sight,
They were droopy, and weak, and grew but a mite.
While wise Carl Johnson's weren't sickly at all,
And some of them stretched near to seven feet tall!

One day, as young Brown was bemoanin' his lot,
And telling his friend how his crops went to pot,
Wise Johnson observed, "I'd say that they totter,
Because they're not getting enough growing water!



"Get USS National Polyethylene Pipe!
Irrigation with ease, keeps crops fresh and ripe.
A snap to install; it's so easy to do.
It goes around corners, and 'neath fences too!"

Young Johnny Brown took friend Johnson's advice,
And now his crops bring the top market price.
Production has climbed, and credit is laid
To National Pipe—NSF Grade!

Remember, USS National Polyethylene Pipe unrolls like a hose, resists acids, alkalies and rot, performs efficiently in a temperature range of −90°F. to +120°F., and won't crack or break in sub-zero weather.

National Polyethylene Pipe comes in lengths up to 400′, in diameters from ½″ to 6″. And, it's made of 100% virgin polyethylene plastic to which 3% carbon black filler has been added to prevent deterioration from ultra-violet rays. Insert fittings in nylon and styrene copolymers (NSF) are now available from National Tube. For complete information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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sonally," Ohm explained, "but as Chairman of the Statewide Water Resources Committee of the California Farm Bureau I am vitally concerned with the welfare of farmers using water for crop production. I feel the acreage limitation works both an injustice and a fraud on small and large landowners alike. It places the burden of cost for importation of supplemental water more heavily on the small landowner. Economic and profitable production of crops often requires larger acreages in different areas because soil and climate conditions vary. Thus, to apply acreage limitations over the country is economically unsound and unworkable. Today's farms are larger. Since 1902 the average farm has grown from 200 acres to 307 acres in California. We have 123,000 farms, 16,000 fewer than in 1945, just 13 years ago. Many factors have contributed to this. Most important is the type of crop produced. Certainly the problem of economic size cannot be regulated by government edict."

Among those who oppose limitations are the California Farm Bureau Federation, the Irrigation District Association, the California Central Valleys Flood Association, the Agricultural Council for California, Central Valley Project Association, San Joaquin Valley Water Protective Association, California State Chamber of Commerce, and the Agricultural Extension Service of the University of California.

In the Other Corner

Those who favor the 160-acre limitation point out that the water brought to the land through reclamation projects would not be available to the farmer except through the help of the federal government. No group of farmers could legally impound the waters of our great watersheds, to say nothing of financing such tremendous projects. Since this work must be done by the federal government, the water should be as democratically distributed as possible. As Dale Carpenter says, "If one man is allowed to capitalize on too much land, he is not giving the rest of us a chance to own and irrigate some land and do something for ourselves. Big grain farmers get big subsidies," Carpenter said firmly. "If the law limited the amount of subsidy these farmers could get it would prevent this robbery of the United States Treasury." Carpenter, who is farming in partnership with his father, is President of the California Swine Producers Association. He believes that efficiency counts more than the number of acres a man farms. "Reclamation has been a good thing as a national policy. The federal government has been a benevolent banker, making long time loans, with the prime policy of establishing homes and farms."

A. R. Chase, a Columbia Basin farmer who opposes any drastic changes in the land limitation procedures, expresses the fear of many of the smaller farmers to a relaxation of the of the 160-acre policy. He said, "Are we going to wake up some day to find this whole three-quarters of a billion dollar

Here's How I Got The POWER I Needed -and believe it or not, with less fuel

It's tough plowing in the river bottom *gumbo* of Carl Schmidt's 765 acres. So tough, that he uses extra-heavy duty plows. Ordinary plows just can't do the job.

But the amazing part of it is that he walks those extra-heavy four 14" plows right through gumbo with tractors that are *18* and *19* years old—a 1940 M and a 1941 M. Not ordinary tractors, to be sure. Carl installed M&W Turbo-Dome Pistons for *extra muscle* to do the job—but let him tell you about it in his own words:

"In 1955, my oldest M was getting kind of shaky in the knees after 15 years of hard use. I needed a lot more power than it could deliver to handle the heavier plow I had purchased. I installed M&W pistons and sleeves along with high-lift rocker arms. And the change it made was almost unbelievable. Where my tractor previously could not handle the new plow it now pulls it at a good speed with power to spare! And I do it with less fuel due to the engine not being overloaded.

"We were so pleased that we decided to go all the way in 'updating' with several other M&W products. We installed a Live P.T.O. Clutch, a 9-speed Transmission and the M&W Live Hydraulic System. All of this not only extended the work-range of the old M but reduced our fuel-cost-per-job as well.

"For instance, by installing the M&W fast mow pulley on the mower it enables us to throttle down the engine in the 12 mile per hour gear and mow 80 acres of alfalfa on a tank of gas at the rate of 5 acres an hour.

"My son insisted we update our second tractor, the 1941 M. So a year ago last summer we had M&W Turbo-Dome pistons installed. To our surprise when the two tractors were working side by side with the same load, the one with Turbo-Domes outperformed the first tractor and on less fuel."

M&W Turbo-Domes *will* increase the horsepower and operating efficiency of *your* tractor—*regardless of age, make or model*. They squeeze every ounce of power from every drop of fuel like no other piston. Let your local M&W dealer show you how M&W products can extend the *work-range* of your tractor.

M&W TRACTOR PRODUCTS

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Anchor, Illinois

PROVEN BY FARMERS IN EVERY ONE OF THE 50 STATES

Write for your copy of FREE Booklet—Lasting Power

Attend
HEART OF AMERICA
FARM BUREAU SHOW
GIBSON CITY, ILL.
SEPT. 12 & 13

project dominated by a few wealthy individuals, or corporation landowners?"

Don Smith, a retired Farm Advisor, who has been active in organizing some 13 irrigation districts preparatory to receiving Bureau of Reclamation water when it is available from the Trinity and Sacramento Rivers, stated, "Why all the fuss about the 160-acre limitation? A farmer has to be mighty good to handle that much, or 320 acres, if he has a wife. And he can lease other land elsewhere if he wants to spread his wings. This limitation doesn't stop a man from getting as big as he wants, and all this worry about the government keeping permanent ownership of the facilities is ridiculous. Those dams and canals are going to stay there. They won't run off, and the local farmers will keep on using them."

Fighting for the retention of the 160-acre limitation along with these men are the State Grange, Farmers Union, Western Cooperative Dairymen's Union, California Farm Research and Legislative Committee, most of the veterans and labor organizations, the League of Women Voters, some religious groups, and some local Chambers of Commerce.

How to Get Around Acreage Limitations

While both groups continue the arguments, the water flows through the canals and very often flows on to the excess land, as well as the 160 acres.

One of the biggest loopholes to the restrictions was left by the U. S. Supreme Court in a decision which stated that a landowner with excess land may pump *project* water from the ground for his excess land, and presumably the district may also pump ground water to supply lands in the district which are in excess of the limitations. An irrigation district may use any water supply to which it has a right, whether it is surface or ground water, and supply such water to excess land except for Reclamation Bureau water. Co-mingling of project water and district water in ditches is allowed provided that no project water is diverted to excess land use.

Another way a man can get more than the 160-acre water limit is to own acreage in 2 or more different districts. The Bureau

BIGGER YIELDS THE EASY WAY

POSITIVE ROTATION. Move after move Buckner's Rainers are self starting. Buckner's GDG Bearing guarantees positive rotation of each sprinkler under normal irrigation conditions. No need to hand start each sprinkler on your line.

LABOR. An experienced irrigator can move four quarter mile lines of 3 inch or 4 inch aluminum pipe in 4 hours. You get even distribution of water over your entire field for peak yields, top quality and more profit. Irrigate the easy way with Buckner Rainers.

Plus **BUCKNER'S GDG BEARING* THE ORIGINAL SANDPROOF BEARING**

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Buckner's GDG Bearing was the first to combine teflon and synthetic rubber washers for a watertight seal to completely protect sprinkler from sand. Teflon and rubber will not stick so you get positive rotation, longer sprinkler life. Only Buckner has three washers at both top and bottom of bearing. Spring at top keeps all six washers snug, forming a long-lasting sandproof seal.

Don't be fooled by "look-alikes." Buy Buckner Rainers with the original GDG sandproof bearing.

Please send me a FREE copy of your "Agricultural Sprinkler Irrigation Manual."

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This Level has 12-Power Telescope and is used and endorsed by Schools, Extension Service and Individual Landowners everywhere.

Accurate, Durable and Complete for Terracing, Ditching Irrigating, Grading, Tile Draining, Running Lines, Turning Angles, etc.

BOSTROM Levels are so simple anyone can operate them by following the direction booklet included with each Instrument. Our No. 4 Contractors' Level and No. 5 Convertible Level feature 16-Power Telescopes. All Bostrom Levels are sold on the guarantee of satisfaction or money back. WRITE TODAY for literature, prices and name of our distributor near you.

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"AS DEPENDABLE AS NEW AFTER EIGHT YEARS"

Says Alvin Hardin, R. D. 2, Knightstown, Indiana

"I can plan for and get an average of 175 bushels of corn per acre every year, thanks to annual soil testing, fertilizing, and irrigation. I use McDowell Couplings exclusively because the results justify the best. They go together and dissemble quickly and easily . . . function as dependably as new after eight years."

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The original automatic pressure lock—just insert tube end into coupling for a leak-proof joint. Water pressure does the rest. Release water pressure to withdraw tube end.

No tools—no threads, no clamps, no latches.

Salvageable from old to new pipe.

Zincillated—for long-term protection. Let McDowell distributors with their experienced irrigation engineers plan the right system for your farm.

THE McDOWELL COUPLING PROTECTS BOTH PIPE ENDS

FOR LONGER LIFE —LESS UPKEEP

McDOWELL MANUFACTURING CO.
Pittsburgh 9, Pa.

DAIRYMEN with 100 COWS OR MORE

You can increase milk production 15 to 25% while increasing butterfat test .2 - .5% . . .

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PROVED by over 75,000 cows in commercial dairy herds.

FOR EXAMPLE: My herd averages 180 cows. I've been feeding Protamone for 10 months. Herd health is improved and my monthly herd milk production is up 24.9%. This is proved by my official DHIA records."

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Los Banos, Calif.

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...and schedule your profits with Reynolds Irrigation Equipment Purchase Plan!

It may look like rain, but the *looks* of the weather won't help your crops. They want water—a scheduled amount of water at scheduled intervals. And a dependable sprinkler irrigation system is the best way to keep crops growing for maximum yield and profit.

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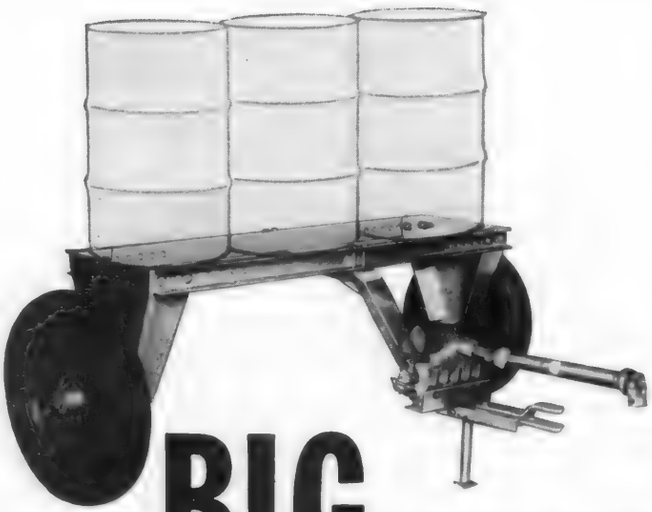
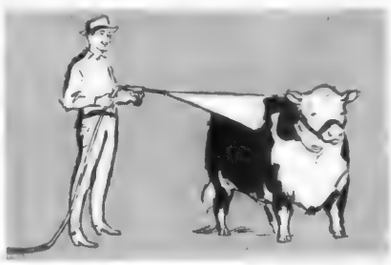


BIG *sprayer performance*

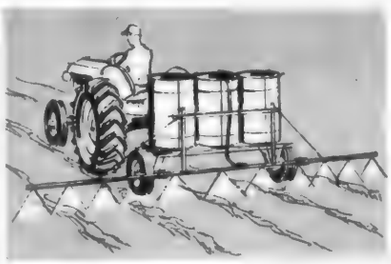
MYERS new trailer sprayer gives you *big* sprayer performance *at low cost*. Saves time, labor and eliminates inconveniences experienced with tractor mounted weed sprayers.

Versatile and rugged too. Pump has ni-resist cylinder shells, stainless steel valves, built-in vacuum and air chambers. Handles all types of spray solutions. Develops 300 pounds pressure at 6 gallons a minute.

Here's plenty of pressure for cattle spraying. Spray trees, shrubs, brush, apply disinfectants in chicken coops, barns. Use on any high pressure job. Gun nozzle is adjustable for spraying a broad, fine mist or a narrow, hard stream.



The Myers Trailer Sprayer can be used with a wide range of booms for low cost weed control and crop protection. Easily adaptable for boomless spraying. Trailer has 30 inch clearance and adjustable tread for wide range of row spacing.



Myers

For complete details on the Myers Trailer Sprayer, see your Myers Dealer—or write to:

The F. E. Myers & Bro. Co.
ASHLAND, OHIO KITCHENER, ONTARIO

of Reclamation has ruled that a landowner in 2 different districts may receive project water for land within the acreage limitations for each district. A variation is the gerrymandering the district lines so that one tract of land falls in 2 or more districts and can receive water up to the 160-acre limitation from each district.

District contracts call for a supply of water quite often sufficient for all the land within the district, including excess land, on the assumption that all such lands would eventually sign recordable contracts for the sales of the excess acreage and thus be eligible for full water supply, but as often happens, the landowners refuse to sign such contracts. What happens to the extra water? It is not unheard of that in a situation where the irrigation requirement is 3-acre feet per acre, there is delivered 6-acre feet to the non-excess land, and that some of this water gets on to the excess land, or into the drains where it is easily diverted to the excess land.

Then, of course, there are such dodges as deeding 160 acres each to man, wife, sons and daughters; forming corporations, with each entitled to 160 acres; partnerships; companies; and other types of land ownership patterns to get around the limitations. Enforcement becomes difficult, if not impossible.

Probably no single phrase has ever been inserted into a Congressional Act that has stirred so much emotion as the 160-acre limitation. Men have worked equally as hard to break the back of the limitation clause as others have fought for its family-farm philosophy. Opponents of the limitation claim it is making second-class citizens of farmers and putting them under the control of a government bureau. Agitating for repeal of the limitation clause, their stated goal is to return all Americans to first-class citizenship where through initiative, work and management they may accumulate as much property as they are able, and set their own standards of living without being subject to the dictates of any federal bureau.

Those fighting to retain the 160-acre limitation claim the issue is the protecting of the natural resources and sharing these irreplaceable resources with the majority of the people. They favor the continued development of these resources provided they are shared in an equitable, democratic fashion.

Every year dozens of measures bearing on this subject are dropped into the Congressional hoppers in both houses of Congress.

If you were a Congressman, how would you vote?

THE AUTHOR: Joseph Muir is a farm advisor in Contra Costa County, California. He has degrees from Utah State and Texas A and M.

AUCTIONS MAKE THEIR BID

(*Continued from page* 59)

tioneer. "And we don't back away," says Ces Emrich, "unless the livestock are found to be unmerchantable after the starting bid."

"If we start one at a reasonable price and the buyers don't go along with us, we buy it. You have to do that every once in a while to protect your consigners."

The Sale Company employs its own order buyer who represents farmers or other buyers who, for one reason or another, would rather have an agent bid for them. A commission of 10 cents per hundredweight is charged for this service.

"We used to buy on order right from the box," Emrich explains, "but the auctioneer can't do a good job trying to represent both the seller and the buyer."

An ordinary sale day will find upwards of 160 individual buyers on the market. Possibly 12 to 15 of these represent packer accounts. The day mentioned, which saw the run of 3,300 head of cattle, resulted in an exchange between 261 consignors and 176 buyers for a gross of $603,700.

Commissions and yardage charged per head are as follows:

	Com.	Yard.		Com.	Yard.
Cattle under 400 lbs.	.95	.25	Cattle over 400 lbs.	1.40	.35
Milk cows and heifers	2.65	.50	Bulls over 750 lbs.	1.65	.50
Hogs under 100 lbs.	.30	.15	Hogs over 100 lbs.	.40	.15
Breeding swine	1.50	.15	Sow with litter	1.50	.15
Sheep and goats	.30	.10		yardage on each pig.	

Health inspection runs 4 cents per head except for butcher hogs which cost three. Bedding in stalls is another five cents and a half cent for bedding hog pens during wet days. Brand charges for cattle and calves is 12 cents a head.

The hog market at Norfolk is rated one of the best in the

country. Joe Bothe, who is in charge, does a first-class job of sorting and the buyers represent a variety of interests ready to absorb any ordinary run without hesitation.

"Hogs are high here," one buyer commented recently, "but you get what you want. Most of them come in the night before. Ordinarily weighing condition is very fair for both the buyer and seller."

From 150 to 250 lots go through the Norfolk dairy cattle sale every Tuesday afternoon. "Our policy is to sell the cow as we see her," Ces Emrich says. "The consignor may say 'She'll be fresh in two weeks,' but we bump her to see for ourselves. The buyer has the right to turn her back after he inspects her. Fewer than one per cent of the sales are turned back. "If a returned cow is 'as sold' we pay the consignor. If she isn't, she goes through the ring again."

It takes constant advertising to keep a market like this functioning. Newspaper ads and radio market reports originated by Ces Emrich, himself, right from ringside, keep producers informed on prices and sale schedules. Some of the markets have a quotation board, just as the terminals, on which is posted the receipts and prices at other markets. Still, one weakness of the auction markets is the lack of an organized market news service.

The auctions present problems in this department, though none of them are insurmountable. First of all there is the time element. On the terminals a USDA reporter starts his beat at 8 or 9 in the morning and has everything pretty well covered by noon. On the auctions the sale is usually just getting a good start by noon. And the number of auctions demands a large staff.

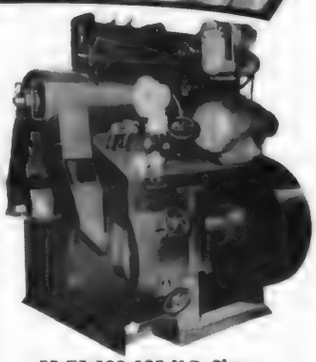
Many of the larger auctions are making every effort to work with federal authorities to set up coverage for their sales. Some of the best systems at this time are in Alabama and Florida. In Alabama, for example, there is a Federal-State Market News Service with 7 reporters who cover a cross-section of the state as well as the three Montgomery markets. The Federal Government puts up about ½ of the cost of the service, the state pays the balance. But even 7 reporters are unable to cover each of the 80-odd markets in the state.

Lamar A. Harden, at Montgomery, in charge of the service,

Wenger's

Multi-Duty PELLET MILL

For CATTLE and SHEEP FEEDERS



50-75-100-125 H.P. Sizes

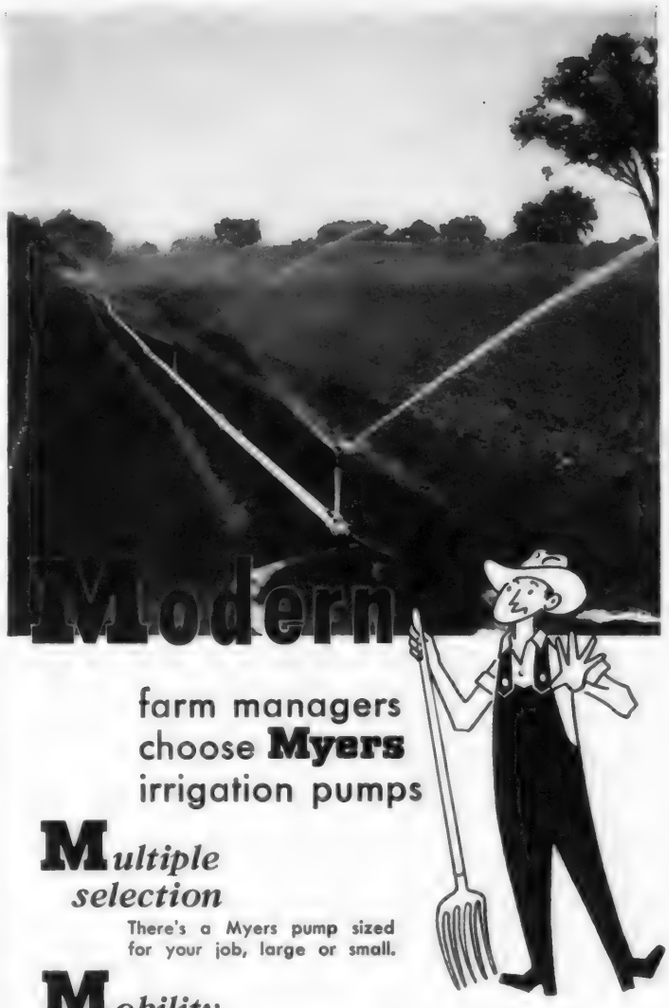
Multi-Duty Pellet Mill, with built in molasses conditioning feeder for the finest hard pellets with molasses. Also produces molasses feeds in mash form. Available also is optional Hi-Molasses Pellet Extruder for this same mill.

Complete ruminant rations in pellet form are a practical reality today. Ground hay, grains, molasses, concentrate and mineral-antibiotic premix in pellet form means a complete ruminant feed which lends itself ideally to bulk handling and self feeders for maximum gains, low costs per pound of gain, and minimum labor in feeding. Multi-Duty Pellet Mill is equipped with built in molasses mixer, conditioner and metered flow molasses pump. The economic and efficient means of achieving every feeder's ambition.

Also manufacturers of 12 models of molasses feed mixers for farm, feed lot and feed mill.

Wenger Mixer Manufacturing

SABETHA, KANSAS PHONE 111



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Pump and engine are "Power-matched" for high capacity and pressure, low fuel consumption.

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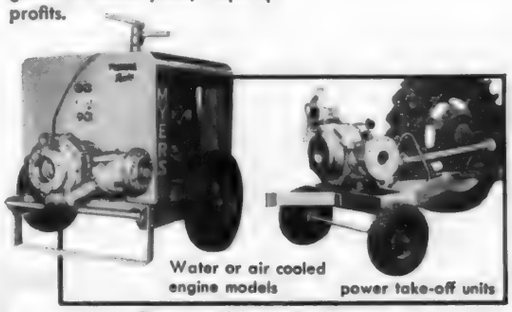

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If you're one of the thousands of dairymen who are looking forward to installing a bulk milk cooler this year, here's what you should expect.

A big saving in labor—no more lifting heavy milk cans, no more complicated "wash-up" chores.

Extra profits. You get paid for all the milk at the farm. Quantity is measured and butterfat tested by the hauler.

Improved product. The milk you ship will arrive at your dairy plant cleaner, cooler, with the lowest bacteria count you've ever had . . . quality pays.

Lower hauling costs. The efficiencies of bulk cooling will lower hauling costs considerably.

Whether you sell to a Grade "A" or Grade "B" market, your future profits will depend a lot on how well you trim your production costs. When you switch to bulk cooling you can expect to make extra profits . . . in addition to your own labor savings.

However, you can get these extra profits only if you have the right equipment. And that's where Sunset comes in. Sunset's farmer-in-mind research gives you the exclusive "*Positive Refrigerant Control*" direct expansion cooling system. It's the same system you'll find in the best household refrigerators. It *cools milk faster* . . . at lower electrical cost.

Sunset has complete line. You have your choice of 11 models in 3 designs, capacities from 155 to 735 gallons. "Space saver" models are ideal for milk houses where room is limited. "Low line" models are best for those of you who want lowest pouring height. "Big standard" models, in capacities from 545 to 735 gallons, fit the needs of the larger dairy farm. For complete facts, write to address below.

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SUNSET EQUIPMENT CO.

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points out that it is the reporter's prime duty to report the prices and grades as he sees them, not as they might be called by someone connected with the yard. "And we are cautious about releasing stand-out sales," he warns. "When we do they are always identified as such. There are times when an animal will be as much as $5 per hundred out of line. Some operators consider this just a good form of advertising. In their own ads and reports they'll stress the standout prices to attract consignments."

Harden is a confirmed advocate of the auction method of selling livestock. He feels there is much less "hearsay" around the rings than on the private treaty markets yet he has no hesitation in pointing out that weaknesses do exist. There are instances where regular buyers have tried to freeze out newcomers by running up the prices; and in some cases there is considerable doubt whether or not the cattle are actually sold when the auctioneer knocks them off to a fictitious name or number. He feels that one of the biggest steps forward in reporting the auctions will come through closer sorting of the offerings by class and by grade. This will speed up the sale and also make it possible to quote prices by grade.

The buyers, of course, particularly the packer buyers who are on the market every day, are their own market reporters and have constant contact by telephone with other markets. This keeps any market from getting out of line very long.

Rough Handling

One of the frequently voiced criticisms of the auction rings is the rough handling given the livestock. This could never be leveled against the Norfolk market. At this auction stock are carefully walked from docks to pens, from the pens to the ring and on to the buyers' pens with the least possible confusion and excitement. A man on horseback keeps the cattle moving slowly while they are in the ring and canes and prods are strictly out of place.

This is in distinct contrast to some of the markets, particularly in the south. There, as one observer put it, "boys on horseback, who apparently see themselves as the reincarnation of a combination of Phil Sheridan, Wade Hampton and Paul Revere, move the cattle at nothing slower than a gallop. In the ring they are turned over to a team of two or three apprentice bullfighters. Then there is another dash before young Sheridan and his charger."

Buyers, sellers and market personnel all claim to deplore the situation, yet at a few of the markets it has been allowed to continue. The Livestock Loss Prevention Board, cattlemen's associations and others are making progress in stopping the practice.

How can the producer use his local auction to best advantage? Ces Emrich says, "Come in and visit. Make use of the market from an advisory capacity as well as a sales arena. We can give a man some pretty good tips on what to buy and when to buy and sell.

"Then, if you are going to buy a load of feeders, for example, look them over in the yards before the sale. Don't pick out just one pen, but line up several, and when you're bidding on them don't be carried away. Set your top limit in advance.

"Some farmers will walk out in the yards, pick out the pen they want and simply make the last bid on them when they're in the ring. That's all wrong and a sure way to pay the high dollar."

Lamar Harden urges the market patron to follow the market releases, those from distant points as well as local reports; and to learn the grades of livestock so he will be able to correlate grade and price. This will enable him to do a better job of bargaining whether buying or selling.

Glenn Stebbins of the Capital Stock Yards, Montgomery, cautions the producer to "sell on a market where there is plenty of buyer competition. Don't try to make a market at your feedlot or pasture. Selling livestock is a highly specialized business. That's where we come in.

"And when you're buying," he says, "if you are not constantly in touch with market trends and are not too good at judging weight and quality get a reputable order buyer to buy for you."

The best advice for any market is to get there with the product the buyers want at a time when it is hard to come by.

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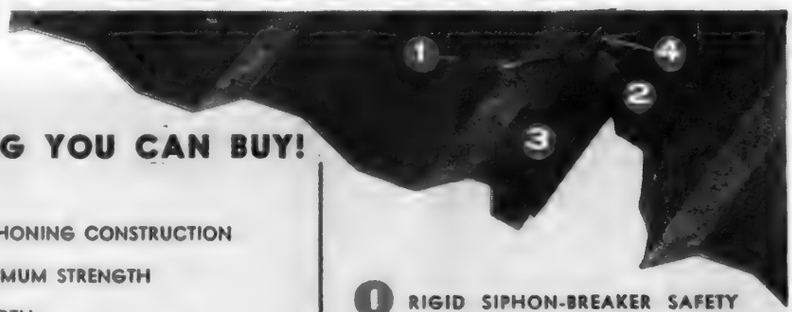

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Promazine Hydrochloride, Wyeth

Farmers, cattlemen, feedlot operators and sheep raisers are finding that a talk with their veterinarian about SPARINE is the first step toward money. SPARINE is the tranquilizer that can be used safely in cattle, horses, swine, and other farm animals.

Mares foaling? SPARINE-treated mares are calm because SPARINE reduces tension, nervousness and unruliness in horses.

How about your sows? If hysteria occurs in any of them at farrowing time, you could lose money. Hysterical sows may injure or kill their newborn pigs. SPARINE tranquilizes most sows; thus treated sows will accept their pigs and nurse them.

Whether it is weaning of calves, castration of bulls, shoeing and hoof trimming, or shipment of animals, your problem will be solved more easily if SPARINE is used. SPARINE *is available only from veterinarians.*

Swine Erysipelas Season Is Now!
INJECTION BICILLIN® FORTIFIED

Benzathine Penicillin G and Procaine Penicillin G, Wyeth

Yes, swine erysipelas season is now—and all year round. Whenever it strikes your hogs, you lose money.

INJECTION BICILLIN FORTIFIED cuts such losses because it provides high concentrations of penicillin in the tissues to kill the bacteria causing erysipelas. These concentrations are followed by lower, long-lasting concentrations of penicillin to help prevent the consequences of joint disease.

Economy is yours too, because *only one injection* provides *specific dual action* against swine erysipelas.

AVAILABLE: As a stabilized aqueous suspension of penicillin in 10- and 50-cc. vials (300,000 units/cc.); in 1-cc. TUBEX® sterile-needle units (600,000 units/cc.); and in 4-cc. disposable syringes (2,400,000 units/syringe).

SPARINE Proves Boon To Sheep Raisers

When young lambs are not accepted by ewes, a sheep raiser is faced with giving them away or bottle feeding. Either way, he loses money.

Recently a veterinarian injected 1298 ewes with SPARINE. The next day it was found that 1160 or *almost 90% of the* SPARINE*-treated ewes would accept strange lambs.*

Talk to your veterinarian about using SPARINE in your ewes at lambing time. It makes money for you.

Attention: FFA and 4-H Members
Planning to ship your animal to show soon?

Talk to your veterinarian about SPARINE before you do.

SPARINE controls tension, nervousness, and unruliness in animals without "knocking them out." SPARINE-treated animals are easier to handle and ship.

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FARMHAND takes the work out of forage handling and feeding jobs!

There's a Farmhand Feeder to fit every farm . . . look 'em over!

BIG "420" FEEDER speeds up all your forage handling, feeding and silo filling jobs. Load it in the field and haul 420 cu. ft. loads to silo or feedlot. Roller chain apron, three mixing beaters and 24″ conveyor belt give thorough mixing and smooth, dependable unloading. Sheet steel sides, ¾″ marine plywood floor mean lowest maintenance costs, longest life. Mounts on truck or heavy duty wagon.

NEW, *LOWER*, 2-BEATER MODEL now available. Retains the valuable features of the regular "420". Sides are 18″ lower for easier loading from overhead bins, etc. The two steel beaters do a thorough mixing job. Ask your dealer about this new model "420".

6-TON "POWER-BOX" with 2-beater Feeder attachment combines huge 300-bu. capacity with the convenience of a 16″ auger-type discharge to save you time and labor. Long-life features include smooth worm-gear drive, roller chain apron, ¾″ marine plywood floor, aluminum and wood sides. Mounts on truck, tandem trailer or heavy duty wagon.

4-TON "POWER-BOX" will haul, mix and feed up to 220 bushels at a time. Tough aluminized steel sides, ¾″ marine plywood floor, PTO-powered worm gear drive, 2 mixing beaters and 12″ discharge auger all add up to fast, dependable one-man feeding at lowest cost. Thousands of these medium-size Farmhand Feeders are now in use on successful dairy and beef operations.

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Make farm living easier, more convenient and profitable, with a dependable Deming Home Water System that gives you plenty of water, when and where you need it.

Write today for FREE bulletins on how important a Deming Home Water System can be to your farm future.

Deming also features a complete line of Irrigation pumps; Turbine, and Centrifugal.

The **DEMING** Co.

914 Broadway • Salem, Ohio

LEPTOSPIROSIS

(*Continued from page* 83)

year. Despite this tremendous loss veterinarians are quick to point out there is no reason to panic. Dr. J. A. Howarth, of the School of Veterinary Medicine at the University of California, cautions against creating "a fad wherein all sicknesses were ascribed to this new causative agent."

Nevertheless, it behooves every owner of livestock from the lady with the Pomeranian to the feeder whose lots are jammed with cattle to be aware of the disease and the methods for its control. While over the country as a whole the incident of the disease is about 5 per cent, in some areas 29 per cent of the cattle herds tested and 14.5 per cent of the individual cattle were blood-test positive; 22 per cent of the serum samples collected from swine at a packing house turned up positive. Of more than 500 horses tested in Kentucky and New York 30 per cent were reactors.

Dr. Howarth notes that in some well-managed beef herds in California where the owners' only complaint was a poor calving percentage there was a consistent abortion rate of 10 per cent due to leptospirosis.

Fifteen cases in humans were reported last year in Iowa and it is believed many more are missed.

The micro-organisms which cause lepto are leptospirae. These are a spirochete-like bacteria, very motile, about 5 to 12 microns long. (A micron is about 1/25,000 inch.) Under a microscope they look like miniature strands of fine wool with numerous coils and spirals. There are a number of different strains of leptospira but the three which cause the most trouble are *L. icterohemorrhagiae,* found in rats and dogs, the cause of Weil's disease in man; *L. canicola,* primarily in dogs; and *L. pomona,* currently the most important of the lot because of its ravages in cattle and swine.

Until recently it was thought that a specific strain would attack only certain animal species, that *L. canicola,* for example, would be found only in the dog and not in cattle or swine. This theory now seems untenable as various strains have been found in several species.

Make no doubt about it, lepto is contagious. And the closer the livestock are confined, the faster the disease spreads. The

Stampede AUTOMATIC CATTLE OILER

Always on Guard PROTECTING LIVESTOCK . . .

AUTOMATICALLY APPLIES INSECTICIDE Water or Oil Base

Recommended for both Dairy and Beef Cattle, also calves. Treats 2 or 3 cattle at a time. Equipped with New Positive Control Auto-Delivery Oil Pump . . . No wasted insecticide. Install anywhere. Cattle can't tear it up.

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TITAN "LITTLE GIANT" only $129.95

F.O.B. FACTORY

COMPACT . . . EASY TO HANDLE — *TITAN* LITTLE GIANT HAS BIG SAW FEATURES

Here is a work-saving tool you can use for dozens of jobs. Compact . . . easy to use, the LITTLE GIANT gives you the quality and dependability for which Titan is famous. Equipped with a precision built engine with anti-friction bearings, big gas tank, recoil starter, multi-position carburetor, easy action thumb oiler, one piece tubular steel handle, automatic clutch and many other TITAN features that make the LITTLE GIANT a big value.

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Send for this colorful bulletin giving full details on Titan "Little Giant" Chain Saws. Ask for Bulletin 114.

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The Truth about Milking Parlor Stalls

Are all milking parlor stalls the same? Not by a jugful! Some may work when they're new, but what will they look like 5 years from now? It will pay you to compare before you buy.

Parlor milking is a great time saver. There's no doubt about it.

But unfortunately, all the talk about the time-saving and step-saving advantages has tended to obscure the fact that there are big differences between the various makes of stalls you can buy.

As a result, many dairymen have installed milking parlor set-ups in the belief that their troubles were over . . . but found it didn't work out that way.

Too late, they discovered that milking parlors *aren't* all the same, and that they were not receiving all the benefits they'd hoped for.

Before you select *your* milking parlor stalls, it will pay you to ask the salesman these questions:

Will they last?

Durability is certainly one of the important things you should be concerned with. Whether you choose a "cow-a-minute" *Herringbone*, a Gate-type, or a Walk-thru Parlor, it will receive heavy use twice a day, 365 days a year.

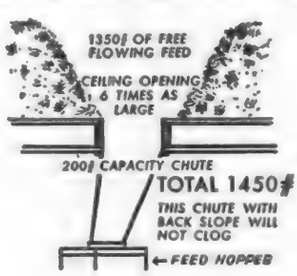
This is where CLAY Stalls offer you the advantage of extra strength, for they are built from *1.66" O. D. high-carbon steel.* Joints have been welded with stainless steel welding rods to give strong, smooth joints. Easy to clean, will not corrode.

Are they electro-galvanized?

Important, too, is the fact that CLAY (and *only* CLAY) Stalls are *electro*-galvanized. Tubing, sheet steel, bolts, and all other parts are protected from rust and corrosion.

In comparing CLAY life-time Stalls with painted or ordinary galvanized stalls, it is important to remember that CLAY'S process of *electro*-galvanizing with pure zinc provides a permanent finish that won't chip off as is so often the case with ordinary dip-galvanizing.

All ceiling support posts on the *Herringbone* stalls have stainless steel sleeves where they enter concrete.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200# CAPACITY CHUTE
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THIS CHUTE WITH BACK SLOPE WILL NOT CLOG
← FEED HOPPER

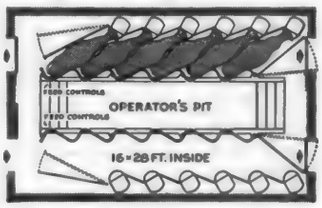
Will feed chutes clog?

Feed is metered down to each hopper through CLAY'S own exclusive *non-clogging* chutes (shown in the drawing above). More than 1400 lbs. of feed can be stored above each hopper.

Since it is so important that each cow be given exactly the right amount of feed according to her production, the extreme accuracy of CLAY'S metering device (patent is pending) is another feature you should demand.

How big are the feed pans?

The CLAY feed pan is 25" long by 18" wide . . . much larger than those furnished with any other make of stall. Furthermore, a steel guard between feed pans keeps cows from spilling and wasting feed.



Plan shows how cows stand side by side in Herringbone. Cows like it and are quieter.

Is it designed for the greatest possible saving of labor?

Since the purpose of your milking parlor is to save you time, you should make sure that it is fully designed to accomplish this purpose.

Here's where the research and experience of CLAY will pay off for you. Take the CLAY *Herringbone* Stalls for example. Every aspect has been carefully studied and tested. Every motion of the operator has been timed.

You almost have to see it to believe it. All sizes of cows can be milked in a CLAY *Herringbone*. Jerseys and Holsteins or mixed herds . . . they'll milk with ease in the same parlor. This is because CLAY engineers have carefully studied dairy cows being milked, and the angle at which they stand with relation to the operator's pit.

These, of course, are but a few of the features you should investigate, but the more closely you compare, the more reasons you'll find for CLAY superiority.

Easy financing

Be sure to ask your CLAY Dealer about the CLAY Purchase Plan. Learn how you can pay for your equipment while you are enjoying its benefits.

Write for more information

CLAY men are specialists in finding ways to help make your work easier. Ask your local Dealer or write directly to CLAY for information on Milking Parlors, Barn Cleaners, Silo Unloaders, Mechanical Feeders, and Crop Driers.

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leptospirae localize in the kidneys and are shed in the urine which contaminates streams, marshy pastures and wet areas. It is probably spread to a lesser extent by breathing droplets of contaminated urine hanging in the air while animals are closely quartered. Contaminated urine is excreted by cattle for 45 to 80 days, by swine for as long as a year, though it is estimated most infected stock remain "shedders" for less than 60 days.

The disease is transmitted from cattle to swine and vice versa and from both these species to man, sheep, goats and horses. Humans become infected through working with the livestock—assisting sows at farrowing, handling raw beef and pork, or swimming in stagnant or slow-moving water contaminated by the urine of the livestock or rats or dogs. Insects, incidentally, have not been shown to play a part in the spread of lepto under natural conditions.

The infection can be spread at breeding but the danger in much less than it is with Bangs disease, vibriosis or trichomoniasis. It rarely causes sterility in either the male or the female unless secondary uterine infections follow abortion.

The diagnosis of the disease is not simple. Blood tests provide the best indication of infection. A veterinarian can draw the blood which is usually sent to a state or federal diagnostic laboratory.

Unfortunately, the present tests do not always give a complete answer. They must be carefully interpreted. They will not separate animals in which the disease is active from those which have had it in the past; nor can they indicate carrier animals. Some animals which excrete living leptospirae in their urine do not have detectable levels of the antibodies in their serum. Such animals, of course, are completely undetected by a blood test.

A bulletin from a leading pharmaceutical house said "The individual treatment of animal leptospirosis has not been rewarding." This same publication adds "the ability of any antibiotic to alter the course of clinical symptoms is doubtful . . . Penicillin for bovine leptospirosis may be little more than a professional placebo."

Dr. Howarth states that severe acute leptospirosis requires blood transfusions and other treatments which can best be administered by a veterinarian. Mild or moderately severe leptospirosis often regresses without drug treatments.

Antibiotics seem to be helpful in eliminating carriers, particularly with swine. But Howarth warns "indiscriminate mass administration of antibiotics brings with it the possibility of creating drug-resistant strains of leptospira."

Aureomycin chlortetracycline or terramycin fed at the rate of 400 to 500 grams per ton of feed seems to do a good job of controlling the disease in hogs when fed for 14 days. They aid in reducing the abortion rate and the mortality of new-born pigs, and help in eliminating the carriers from the herd. It was found in experimental work that feeding aureomycin at the rate of 0.5 milligrams per pound of body weight per day for one week prior to and for 14 days after exposure to *L. pomona* prevented the passage of the leptospirae in the urine of the calves.

A single injection of dihydrostreptomycin has been found effective in eliminating the carrier state in swine. This treatment may prove easier than oral doses of antibiotics for several days.

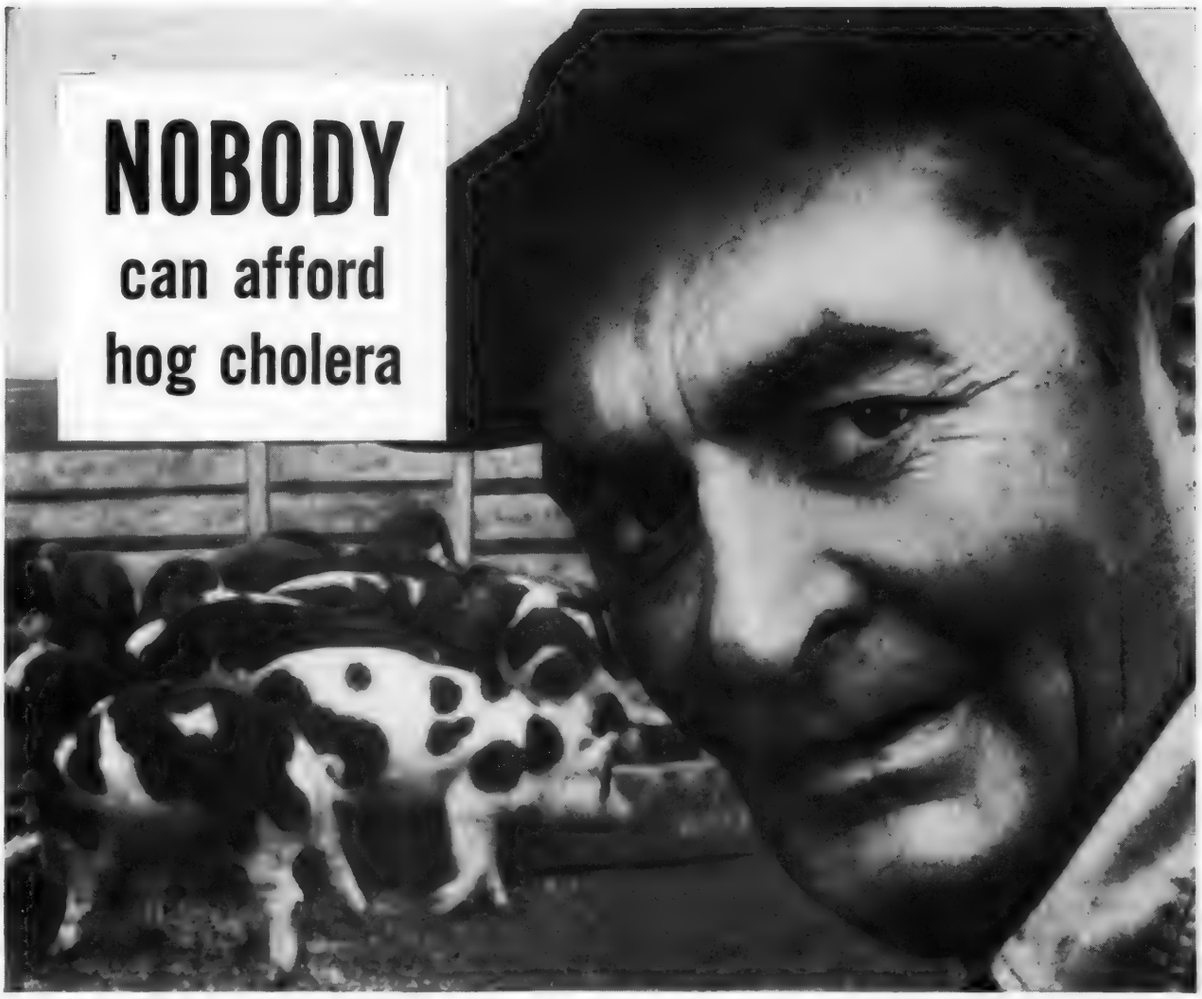
Vaccination is no cure for lepto but does a very creditable job of prevention. Since only killed cells are used in the vaccine it is quite safe. The vaccine (an *L. pomona*-type bacterin which is effective against only the *L. pomona* organism) is available from most of the leading firms supplying animal vaccines.

An injection of 5 cc. in the neck or just behind the foreleg affords protection for 6 months to one year. The treatment is inexpensive, particularly when compared with the ravages the disease can cause.

Vaccination is ordinarily a job for the veterinarian, though many veterinarians, particularly those whose territory includes the more remote sections of the range country, are suggesting that the farmer or rancher do the job himself. However, the decision to vaccinate should come from a veterinarian to prevent a lot of needless treatment.

Dr. Erskine V. Morse, of the Veterinary Medical Research Institute, Iowa State University, recommends vaccination under the following circumstances:

(a) On range where the stock are not crowded and vaccination protection can get ahead of the disease. (b) For cattle when



consult
your
veterinarian

he knows best
—what's best

"Me? I keep two sets of dates— one for farrowing, one for shots"

It is good business to make vaccination shots automatic when your pigs reach the right stage. Hog cholera is still the worst thing that could happen to your herd—and it could happen! It is also good business to have your veterinarian handle the vaccinating. He will pick the right time and make sure your pigs are in the right condition.

Through the last 8 years thousands of veterinarians have given millions of swine protection with Fort Dodge M·L·V. The first-licensed modified live virus vaccine. Used simultaneously with serum, it gives immediate protection, establishes long-lasting immunity, is safe. M·L·V is patented. Made by the world's largest exclusive producer of veterinary products.

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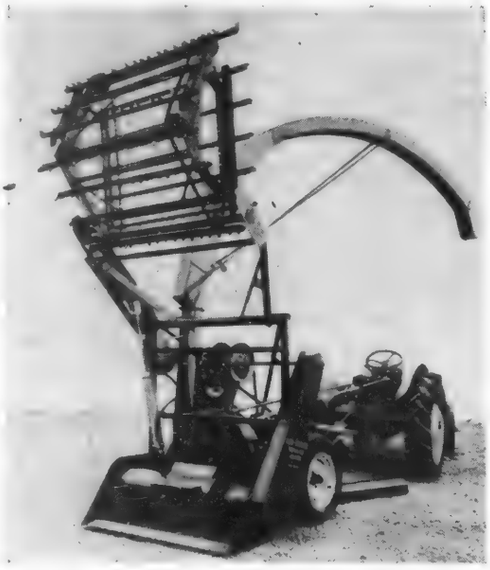
Takes the Hard Work out of Cattle Feeding— Prepares Feed to give as high as 30% more value!

The modern SUN-MASTR TRENSLIGE Loader provides the Quick, Easy way to save time and labor for ALL users of Trench Silos.



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Has extra-powerful blower. Proper speed ratio of auger, digger and blower determined by years of field testing.

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the disease appears in swine on the same farm or *vice versa*. (c) For bred heifers when separated on pasture or lots from the main infected herd. (d) In non-infected herds when leptospirosis is present on adjacent farms with common surface drainage. (e) For herds into which frequent replacements or additions are made. (f) For stock three weeks prior to shows. (g) For young stock to be kept as breeding animals.

Vaccination is helpful even in infected herds, if the disease is diagnosed promptly. If losses have occurred for some time, say 3 weeks or so, little benefit can be expected as most of the cattle will have been exposed.

Present recommendations for control of leptospirosis include the following:

(1) Isolate sick animals if possible. Dr. Herbert Stoenner, of the Rocky Mountain Laboratory, Hamilton, Montana, warns, however, "since infected animals which show no symptoms are as contagious as clinically affected ones, little benefit is gained by isolation or segregation of clinical cases."

(2) Burn or bury aborted fetuses, afterbirths, dead animals and contaminated bedding or fodder. While this is always good sanitation, some doubt that it helps much in controlling lepto. Leptospirae do not survive very long in dead tissue.

(3) Maintain constant warfare on the rat and mouse population and keep stray dogs off the place.

(4) Do not feed abnormal milk to calves, swine, poultry, dogs or cats. Milk for human consumption should be pasteurized.

(5) Unless drainage from contaminated corrals flows into other lots, a fence may be a very effective barrier against the spread of the disease. Since water is an important means of transmission, ponds, marshes and slow-moving streams should be fenced off.

(6) Water stock from tanks rather than from streams or ponds. Keep the aprons around the tanks dry.

(7) Vaccination and other treatment given as advised by a veterinarian.

(8) Isolate and test herd replacements. If reactors have been purchased they can be isolated until they have ceased shedding the leptospirae. Cattle losses can be averted by vaccinating the resident herd or by selling for slaughter the purchased reactors.

Disposal of infected animals causes stockmen a lot of concern. Dr. Stoenner suggests:

"Mature cattle which show no symptoms should bear no stigma because they react positively to a blood test. After these ani-

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(Includes all feed except sow's milk)

	No. Litters	Pigs Farrowed	Av. Wt. Birth	Av. Wt. 28 Days	Av. Wt. 56 Days	Av. Wt. 112 Days	Days to Reach 200 Lbs.	Feed Consumed	Av. Daily Gain from Birth
'57	9	110	2.6 lbs.	14.8 lbs.	40 lbs.	111 lbs.	165 days	585 lbs.	1.10 lbs.
'58	10	116	2.9 lbs.	15.8 lbs.	47 lbs.	131 lbs.	145 days	520 lbs.	1.34 lbs.

To market sooner on 65 lbs. less feed per pig

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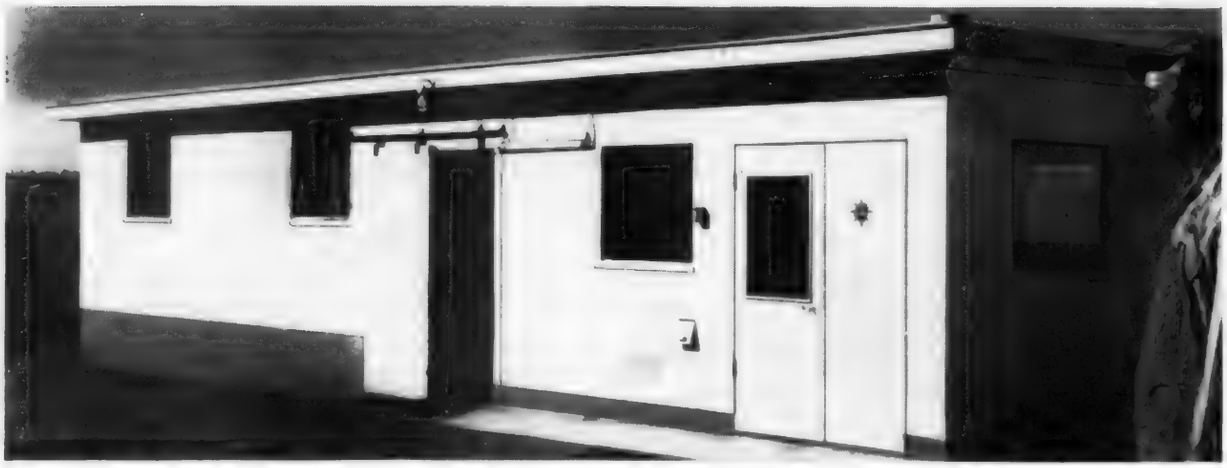
Iron injection at birth, Red Rose Pig Starter Pellets, Red Rose Pig Grower Pellets and Red Rose Porkmaker have proved their ability in research studies to give you more pork at less cost. Or, if you prefer, use Red Rose Pig & Hog Supplements and your own grain. Ask your dealer about the complete Red Rose Thrifty Pig Feeding Program. He'll gladly supply a free Red Rose Thrifty Pig feeding chart.

Distributors from Maine to Florida; Ohio to the Atlantic



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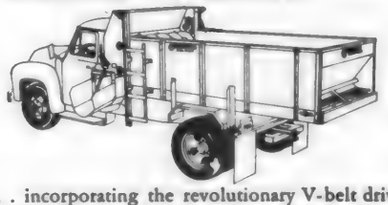

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mals have regained their weight loss and ceased shedding leptospirae, their value as breeding stock or milk cows is restored. Presumably these cattle possess a lifetime immunity and should be retained in the herd. The same is true for breeding swine.

"Cows which abort and retain their placental membranes present a problem. In some herds, a third of such animals failed to conceive during the following breeding season. In commercial beef operations, weed out barren animals after the breeding season.

"The production of dairy cows during a lactation following abortion is frequently not profitable. Whether such cows should be sold for slaughter depends on their breeding value, feed costs and other factors.

"Cattle, particularly young animals, which manifest the typical unthriftiness of chronic leptospirosis usually do not make profitable gains for two to four months post-infection. Attempts to finish such cattle for slaughter before nature has restored normal physiological functions are met with little success . . . To replace lost protein and maintain a normal balance, it is necessary to provide these cattle with a ration containing an adequate protein content."

Leptospirosis is a mean and sneaky infection. There is still much to be learned about it. But it can be whipped and there is no reason for anyone to hit the panic button because he suspects it in his herds.

Knee Deep In Hog Profits

MARKET 'EM 2 TO 5 WEEKS EARLIER ON OCCO'S COMPLETE "Pig To Payoff" PROGRAM

"OCCO's Pig to Payoff" feeding program produced the best results I've ever obtained," according to Ambrose Dulas (New Richland, Minnesota) — standing among some excellent hog profits "on the hoof" in the photo above.

Every hog raiser can be knee deep . . . or hip deep . . . in "hog profits," *if* he's done a good sound job of management and feeding in the months prior to marketing. You can provide adequate facilities and sound hog management. But, for tested, proven feeding results, why not ask your OCCO man to tell you all about the complete OCCO "Pig to Payoff" feeding program. He'll give your pigs a fast, safe, scour-free start on OCCO Pig Starter Pellets (with Dynafac) a week or two after farrowing. After they reach 50 lbs. you can push 'em faster . . . and cheaper . . . using your own grain with OCCO-Trate "40," OCCO Hog Pellets, OCCO-Lak and famous OCCO Hog Mineral. Thousands of top hog producers have switched to OCCO's "Pig to Payoff" program. It will pay you to try OCCO, too. You'll see a Big difference in results . . . and PROFITS!

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I farm.....(no.) acres; I expect to farrow.....(no.) sows.

(This offer expires October 31, 1959)

Some Excellent Territories Available In Your Area For Qualified OCCO Service Men. Write For Details.

COST ACCOUNTING

(*Continued from page* 50)

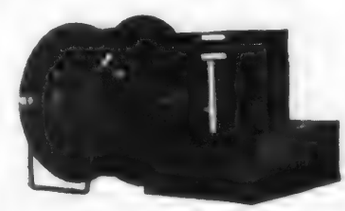
Their records have also made them distinctly aware of the relationship between crop yields and cost of production. For a number of years corn yields have been running 70 to 95 bushels per acre with production costs ranging from 69 to 85 cents per bushel. Last year, a wet season, the yield averaged only 62½ bushels, jumping the production costs to $1 per bushel.

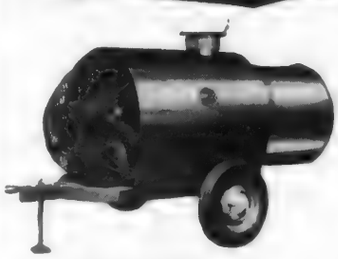
In 1954, the Lichtensteigers found that with a yield of 36 bushels of wheat per acre their production cost per bushel was $1.34. Due to bad fall weather in 1954, no wheat was planted for 1955 harvest. In 1956 they averaged 22.8 bushels of wheat per acre at a cost of $2.20 per bushel. "In 1957, our yield dropped to 19.6 bushels per acre," Dean said, "considerably better than the national average, but our costs rose to $2.44 when wheat was selling for as low as $1.90 direct from the combine here."

Their oats in the past 5 years have yielded from a low of 37.7 bushels to a high of 75 bushels, with costs varying from 54 cents to $1.03 per bushel. "With grain production costs fluctuating so and rising so close to declining market prices, it is easy to see why we like to keep a few other enterprises going," said Fred, the eldest son.

The dairy herd at Circle L Farm consists of about a dozen Milking Shorthorns. Last year the dairy enterprise netted just over $1,000, with milk selling for $3.73 per

You Can Solve Any Crop Curing Problem with Hartzell Drying Equipment





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Rain, wind or hail damage to standing crops . . . moisture, mold or insect damage to stored crops . . . Hartzell can help you stop them all.

Hartzell's complete line of drying equipment includes portable dryers, batch drying bins and fans for natural air drying. And you can trust your Hartzell representative to recommend the right equipment, because no matter what your job calls for, he can supply it.

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Doane, the oldest and largest organization devoted to farm management, appraising, and agricultural research, offers these services:

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2. Consultation services permit the owner-operator to benefit from Doane Farm Managers' training and experience. Farmers and farm owners consult Doane before making important decisions on all kinds of farm problems.

3. Farm Appraising is used profitably in the purchase and sale of land, for evaluating estates, and establishing the value of land to be taken for public use. Appraisals are also made of urban and rural properties for tax equalization.

4. Special Management Plans are developed for farm owners for basic management programs or to check their own operations. Plans contain new methods that have proven profitable.

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Doane Farm Managers have had an outstanding record of success for a number of reasons:

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3. **Careful selection** of managers and appraisers gives you men who grew up on farms, were educated in agricultural colleges and are carefully trained by Doane.

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Three other major Doane services support and contribute to profitable farm management:

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3. The Doane Research Staff conducts for industry many types of agricultural research including the field testing of farm equipment and supplies.

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hundredweight, as against $4.12 a hundred in 1957. Production per cow was 8180 pounds, an increase over earlier years. Home grains with supplements averaged $2.21 a hundred compared to $1.94 in 1957.

Beef cattle on the farm are limited to steers and some heifers from the dairy herd with about 10 to 15 head fattened annually as long yearlings. The beef enterprise grosses from $3,000 to $4,000 a year.

The hog enterprise is kept the most flexible of all. In round numbers, gross receipts in recent years have varied like this: 1954, $18,000; 1955, $12,000; 1956, $10,000; 1957, $16,000; 1958, $7,000. Karl, who fattens out the hogs, has said, "Our guesses on the hog market are no better nor worse than most farmers, I suppose. Dad leans a little stronger toward livestock, but my brothers and I are a little in favor of more cash grain sales, because the government seems to favor the cash grain over the livestock men."

From 15 to 20 sows are bred to farrow twice a year. Multiple farrowing, though tried, did not work as well with present facilities and posed greater sanitation problems. The present sows, themselves crosses between a Conner Prairie hybrid boar and Chester White dams, are currently being bred to a Landrace boar.

This year, the Lichtensteigers have their laying pens filled to capacity, 2400 birds, leghorn hybrids. About 4 cases of eggs are collected daily. By installing a walk-in cooling room several years ago, the partners have been able to secure a 3 cents per dozen premium on eggs. Though feed costs per hundredweight went up from $3.12 in 1957 to $3.23 in 1958, the average selling price per dozen eggs rose from 35 cents in 1957 to 39 cents in 1958. This, along with an increase from 1175 to 1640 hens in the same period brought their egg profits up from $262 in 1957 to $631 in 1958. This year's egg prices have dimmed the profit prospects but Paul can handle hens and eggs, whereas his health no longer permits him to do much heavy field work.

Dean, the youngest Lichtensteiger, is employed as a field man by the Walley Agricultural Service of Ft. Wayne, Indiana. Dean's hours are flexible enough to permit him to assume some of the chores night and morning. John Walley, his employer, has watched the Lichtensteigers evolve into "general farmers with record-keeping

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A twice Nat'l Gr. Ch. Red Poll cow with 4 AR records to 366 lb. BF, whose '56 son (a steer) had a marbling score of 10 (top) and a loin-eye area of 3.16 Sq. in. per 100 lb. liveweight and whose '57 son (a bull) gained 2.5 lbs. per day plus 70 lbs. birthweight. A top example of Red Polls' being "Truly Dual-Purpose," a real meat-milk breed.

Select Red Poll cows produce profitably in the dairy—produce good to choice beef carcasses from the calves of the same cows; or use the extra milk produced by **average** Red Poll cows to produce faster, cheaper gaining, good to choice milk-fat calves in your cow-calf program. Ask for FREE breed literature; send $2 for year's subscription, $5 for 3 years to breed magazine.

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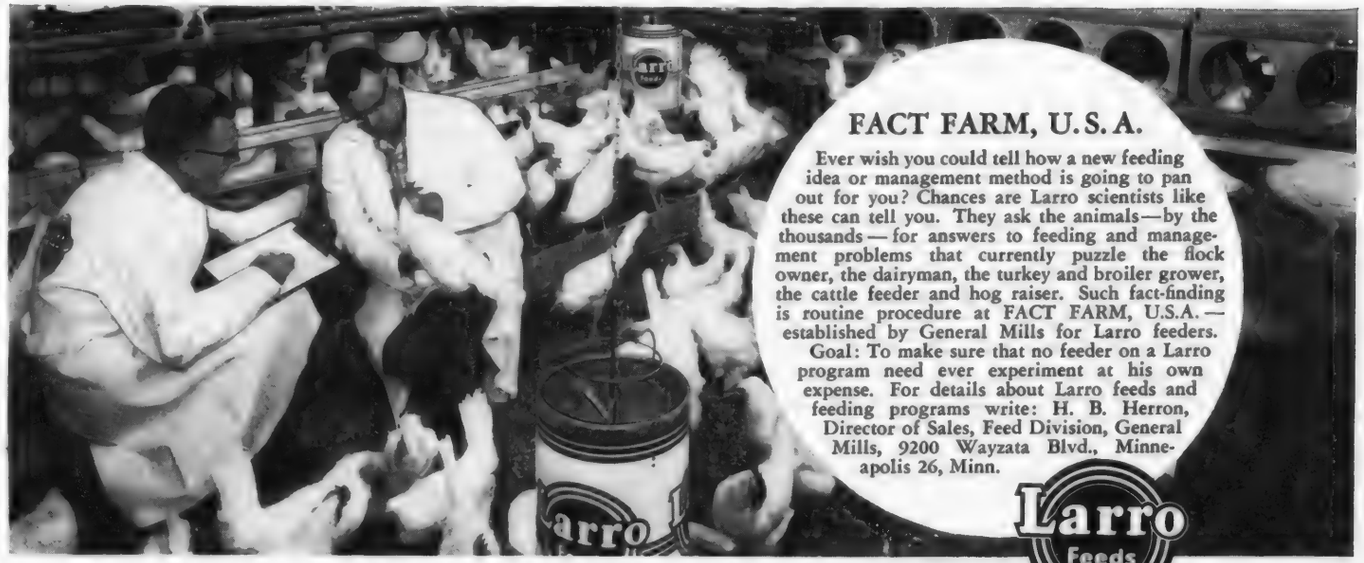

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Goal: To make sure that no feeder on a Larro program need ever experiment at his own expense. For details about Larro feeds and feeding programs write: H. B. Herron, Director of Sales, Feed Division, General Mills, 9200 Wayzata Blvd., Minneapolis 26, Minn.

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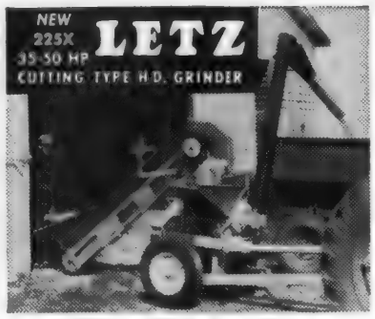

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their specialty." In the opinion of Walley, "Any little garage owner or shop keeper knows better than do most farmers where he stands cost-wise. The Lichtensteigers do a better job of cost accounting than we, as professional managers, do, in most cases, because of the difficulty in getting tenants to keep the necessary daily records.

"I believe the Lichtensteigers are right in holding on to a varied group of enterprises as long as accurate cost analyses prove them to be profitable. It is impossible for every farmer to specialize. Often, there is no money available for an intensified program. And, on most farms there is so much ground unsuited to cash grain, for instance, that a farmer must turn to beef cattle or sheep to use the rougher land. I am tired of hearing that farmers must grow bigger to survive. Bigness isn't the only answer."

Walley's observation leads to an idea which is a brand-new approach to arriving at management decisions in farming. This is a process called Linear Programming. It uses complicated calculating or "thinking" machines now available to industry and science to reveal to the farmer where his most profitable opportunities lie. With these machines, Linear Programming is able to explore all possible farm enterprises and combinations of them at various levels of emphasis within the limitations of the farm's land, labor and capital. From its conclusions the operator can decide between his alternatives.

Its big drawback, of course, is its cost—perhaps $3,000 for an average farm. But those who have worked with it point out that the greatest part of the cost is in the acquisition of reliable records, the facts and figures to feed into the machine. For men like the Lichtensteigers with detailed, up-to-the-minute records the hardest, most expensive part of the process is complete. For them, Linear Programming is a real possibility—at a cost of roughly $200.

To sit down and try to interpret their figures, balancing one enterprise against another while speculating on possible cost and price trends and capital and management potential would take endless months of calculating with paper, pencil and adding machine. But these same figures can be fed into calculators used in Linear Programming and the answer comes forth immediately. This may be the next step for general farmers like the record-keeping Lichtensteigers.

Produce your own feed from your own forage

Records show that you can save up to 80 percent of protein supplement cost by feeding dehydrated alfalfa made into pellets.

Using a Heil dehydrator to dry chopped hay before pelleting preserves nutrients that are often leached out of the hay by wet weather. Fed to livestock, these pellets take the place of protein supplement. Beef cattle show substantial increases in gain and dairy cows show production increases up to 15 percent.

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Save valuable protein, Vitamin A and other health and growth factors in your hay with the Ardrier Farm and Ranch Dehydrator. **Write, wire or call**

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MS-2

THE PSEUDO CORPORATION

(*Continued from page* 88)

For the farmer nearing the retirement age of 65, a corporation may insure a constant annual salary on which the social security base will be established—the corporation absorbing the loss during bad years so that his personal income will be maintained. After retirement, he can still work for the corporation and draw a salary up to $1200 a year without losing any monthly benefit checks. He could also receive dividends from the corporation without affecting his social security. The profits a stockholder in a pseudo-corporation includes in his gross income at the end of the year are not considered self-employment earnings. Confusion on this point was resolved last June when the Internal Revenue Service issued Rev. Ruling 59-221.

Still another advantage is that the farmer can now share some of the benefits he formerly gave his workers. Since he is now an employee of the corporation, he can, for instance, set up for himself a program for retirement, insurance and sick pay and he can also benefit from liability insurance and workmen's compensation. All of these were denied him as the employer.

The Disadvantages

There are some disadvantages. A lawyer will certainly be needed and his fee will depend on the size of the farm and the diffi-

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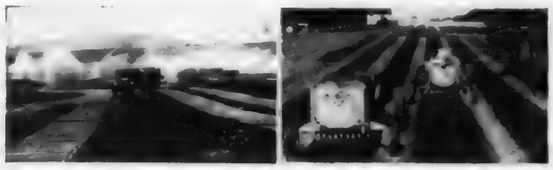

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SEEDLINGS and TRANSPLANTS at LOW, QUANTITY PRICE

500 at 1000 rate	*Per 100*	*Per 1000*
SPECIAL STRAIN SCOTCH PINE Very best Christmas Tree strain. From seed collected by our men from selected parent trees. Healthy, sturdy, straight stemmed, rich color. All other best strains.		
2-yr. Seedlings, 3-6"	$ 5.00	$ 25.00
2-yr. Seedlings, 4-8"	6.00	30.00
4-yr. Transplants, 8-12"	20.00	100.00
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2-yr. Seedlings, 3-6"	$ 5.00	$25.00
3-yr. Seedlings, 8-12"	9.00	45.00
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Tops in Material Handling! the **Cobey** 51-BF Bunk Feeder Wagon

"It's the greatest year-around material handling wagon I've ever seen—nothing can compare with my 2 Cobey's. In silo filling, I've saved 2 extra men—and that meant $800 in my pocket—eliminated the 3rd wagon, too! When you farm 460 acres, take care of 100 Holsteins, 120 ewes, 100 hogs, and finish out 20 head of beef, fast low-cost material handling is vital—my neighbor and I (just the two of us), have chopped, hauled and blown as much as 100 tons of silage in ½ day!—thanks to my 2 Cobey's and a good blower. And my Cobey's haul and unload anything—ear corn, shelled corn, even chopped corn stalks, wheat and oats—and of course, grass forage into my bunk feeders. I've tried other makes of forage and bunk feeder wagons—They're out! Cobey can't be matched!"

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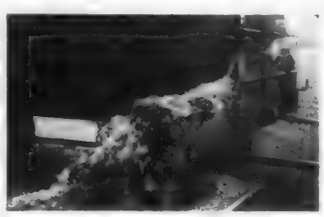
- **FASTER—EASIER CONTROLLED UNLOADING**—Main conveyor speeds adjustable from 1½ to 12 ft. per minute.
- **EASILY CONVERTED TO REAR UNLOADING**

LOOK AT THIS UNLOADING VOLUME

Here's performance that really pays off in time, work, and money saved. Cross conveyor is pulled not pushed and unloads at either ground level or bunk-feeder height. ▶



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Yes, send me full information on your 51-BF Bunk Feeder Wagon. (FQ-S59)

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THE *Cobey* CORPORATION
Galion, Ohio

culties in writing the article of incorporation and the by-laws, and setting up the capital accounts. There will also be organization taxes, a federal stamp tax, and quite likely some special state fees and taxes. All these are based on the value of the business or of the stock. They will total somewhere between $200 and $500.

Since the pseudo-corporation is a new thing, a farmer should check the state tax laws to see if the pseudo-corporation will be taxed locally on the basis of corporation profits and dividends. This could eat up some of the tax savings or it might make it necessary to keep two sets of books, which would be expensive and bothersome.

Even where the advantages of incorporating far outweigh the disadvantages, there is still a question of size of operation which has a bearing on whether or not to incorporate. Robert A. Smith, farm management specialist at Cornell University, suggests a $100,000 investment level as a rough rule. A farm capitalized at more than that amount should consider incorporating. With less, incorporating probably won't be advantageous.

Tax Comparisons

Profits of real corporations are taxed at a rate of 30 per cent on the first $25,000 and 52 per cent on all above that. These rates will be in force until July 1, 1960 when pre-Korean schedules of 25 per cent for the $25,000 and 47 per cent of the excess will take effect—unless delayed again by Congressional action. If the profits are distributed as dividends, each stockholder must pay personal income tax on his share.

Profits made by a pseudo-corporation will all be taxed at the personal tax rate of the stockholder, just as those of a partnership or individual owner are.

There are situations in which the real corporation will have the advantage from the point of view of taxes and other times when the pseudo-corporation, partnership or individual ownership will have the best tax situation, as in these examples.

Example 1: A young married couple with one child net $16,000 from their farm, which is their only source of income. Using standard deductions, they would pay about $3,080 as individual proprietors or as a pseudo-corporation. In a real corporation, if their farm work justified a total salary of $16,000, the corporation would have no net profit and total tax would remain the same. If, however, the man's salary was set as $12,000, personal income tax would be $1,992 and the $4,000 profit remaining to the corporation would be taxed at a rate of 30 per cent, or $1,200, giving a total tax bill of $3,192. This assumes the $4,000 corporation profit would be reinvested or allowed to accumulate.

Example 2: With a net income of $22,000, the same couple would have a personal tax, either as individuals or pseudo-corporation, of $5,008. Incorporated they would pay $1,992 tax on his salary and the corporation would pay $3,000 tax on the $10,000 of undistributed profits, for a total tax bill of $4,992. This again assumes that the corporation profits would be reinvested or allowed to accumulate.

Example 3: With the same situation as described in Example 2, with a net profit of $22,000, the corporation pays $4,000 in dividends in addition to the $12,000 income from salary. Personal taxes for salary and dividend would be $3,080 (dividend exclusion, which would amount to a saving of about $156, is not included) and corporation tax would remain $3,000 for a total tax of $6,080. Declaring a $4,000 dividend would cost them more than $1,000 in taxes over what a pseudo-corporation would have had to pay.

In most small, family corporations, salaries plus bonuses are set up to use as nearly as possible the total income of the corporation, so that dividends are seldom paid. This often brings a conflict between the corporation and the Internal Revenue Service, which has fairly strict requirements that the salaries paid be proportional to the work of each employee, particularly where employees are also major stockholders in the corporation. This is never a problem with the pseudo-corporation. Salaries can be kept at an adequate level and all the excess profits are distributed according to the invested interest of each stockholder.

As net income works higher, the real corporation is at a decided tax disadvantage, unless the excess can be used by increasing

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More uniform in thickness. No thin, weak spots. You can use the most economical gauge. Protects a little better, too —because it comes in wide seamless *widths.*

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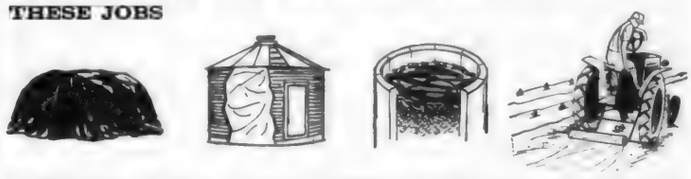

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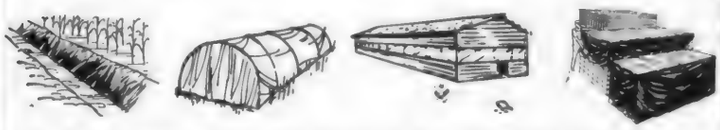

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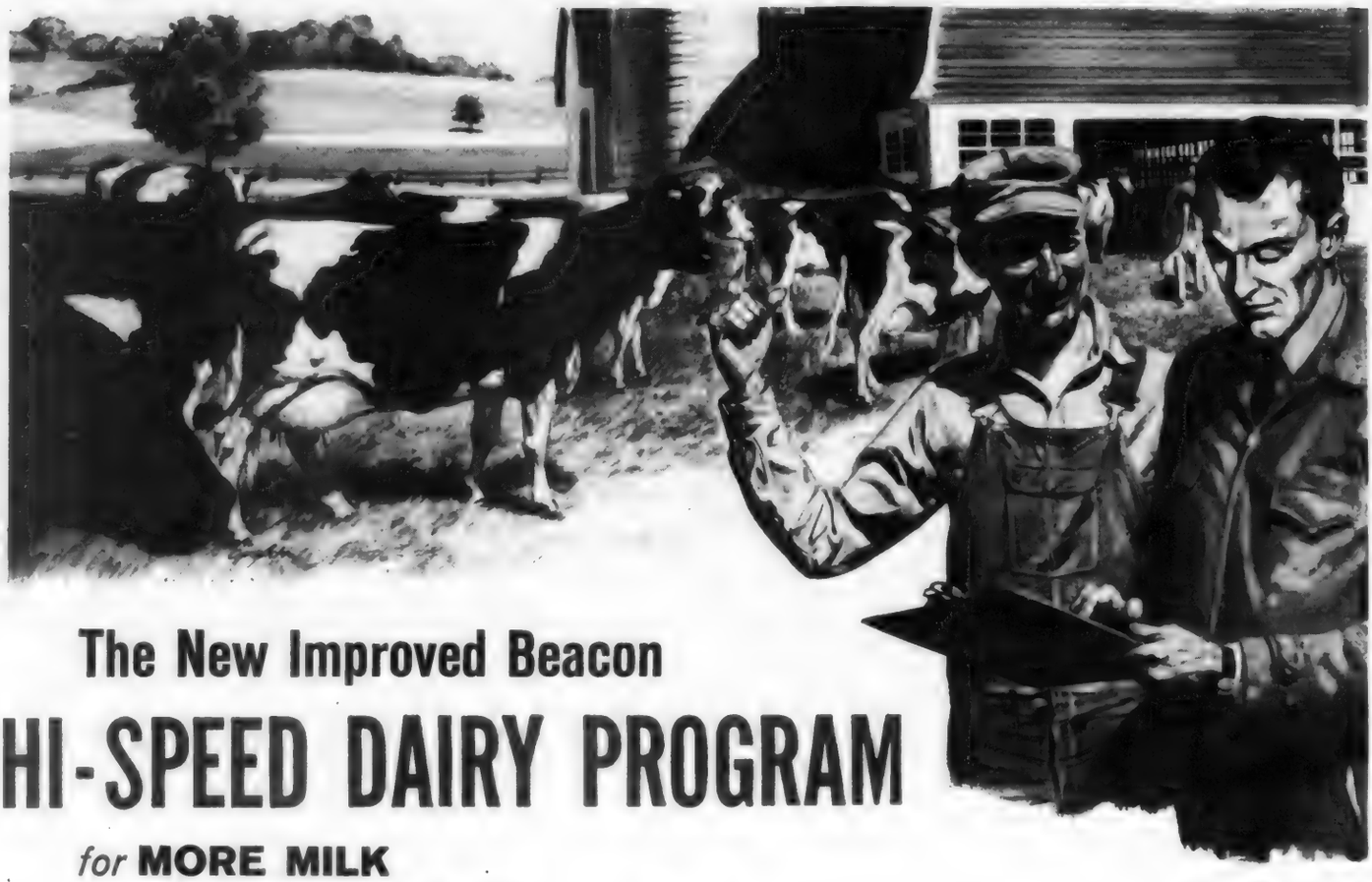
From Beacon Research—for cows of high production capacity



The New Improved Beacon
HI-SPEED DAIRY PROGRAM

for MORE MILK
GREATER RETURN *over feed cost*

Stabling time means a new feeding season is here. The *new* improved Beacon Hi-Speed Dairy Program provides scientific feeding schedules, planned according to the present production record of each cow. There is no set grain-to-milk ratio, which tends to underfeed the high producer and overfeed the low.

This is truly *precision* feeding designed to meet *changing nutrient requirements* — minimize production drop at stabling time. It is designed to feed out all of a cow's inherited production capacity for *more milk* and *greater return over feed cost.*

Check The Results

Cows at the Beacon Dairy Research Farm produced *up to* 3,724 lbs. more milk per cow, and *up to* $112 extra return over feed cost on the new program. Comparable roughage — excellent early-cut, heat-dried hay was fed both years.

Average figures, corrected to the mature equivalent basis, were as follows: 11 cows—2 lactations 2x 305 da. ME.

New Program (1958 — average age 6-4)	18,347 lbs.
Old Program (1957 — average age 5-3)	16,885 lbs.
difference:	1,462 lbs.

Average increase per cow: 1,462 lbs.

On the average, each cow received 360 lbs. more grain on the new hi-speed program. Figuring grain at $4.20/cwt. and milk at $4.40/cwt. each cow on the new program returned an *average* of $49.20 more *above feed cost* than the already excellent results on the old program.

Average extra return above feed cost per cow: $49.20

What this means to you

Producers with cows of high production capacity can benefit from the new improved Beacon Hi-Speed Dairy Program — designed to more closely match the nutrient need with the amount of grain required for *inherited-production-capacity* feeding. It adds up to more milk and greater return.

Your Beacon Advisor has the answer

With his help, the benefits of *Hi-Speed Feeding* can be yours. He can help evaluate production capacity and roughage quality . . . and feed grain accordingly for *more milk — greater return over feed cost.* Invite him to visit your farm.

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Shreds stalks, mows pastures, clears underbrush, tops crops, mulches stubble, works all over your farm all year round.

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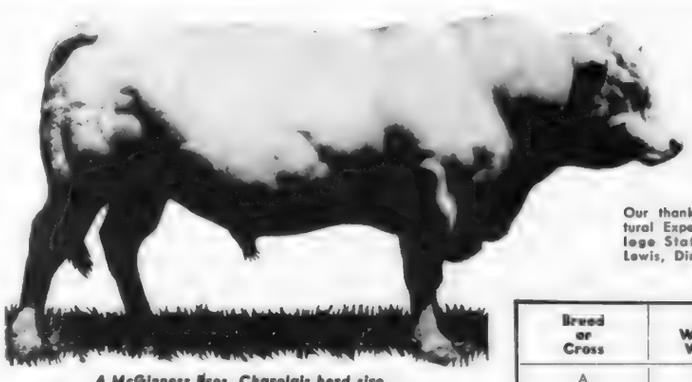
salaries or by expansion. A growing corporation, however, that can reinvest a major portion of its net income in land, machinery, or buildings, each year can offer a big tax saving over a partnership or pseudo-corporation.

Example 4 shows this. A father and his two sons, operating under a partnership or pseudo-corporation agreement, produce an annual net income averaging about $60,000 a year. Each man has one dependent.

Assuming that all three have equal investment in the farm and work equal amounts each year, the net income will be divided evenly three ways. Each will pay $4,532 on his $20,000 for a total tax of $13,596.

Operating as a real corporation, *provided they could reinvest their corporate profits,* they could set salaries at $12,000 each for the boys and $15,000 for the father and use all the corporation net income in expanding the operation. The taxes would be: $2,148 for each son; $2,960 for the father; and $6,300 corporation tax. The total income tax would be $13,556. Since the corporation profit had been reinvested rather than distributed, they would have no double taxation.

Example 5 shows how incorporating affects an individual who is already in a high tax bracket other than from farming. If his average income from farming is around $20,000 a year and his other taxable income $30,000, his annual tax would be



A McGinness Bros. Charolais herd sire.

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Breed or Cross	Avg. Weaning Weight	Lbs. per day of age
A	340	1.7
B	475	2.0
CHAROLAIS	**607**	**2.3**
CHAROLAIS	**502**	**2.1**
E	305	1.7
F	393	1.8
G	447	2.0
H	438	1.8
I	437	1.8
J	446	1.8
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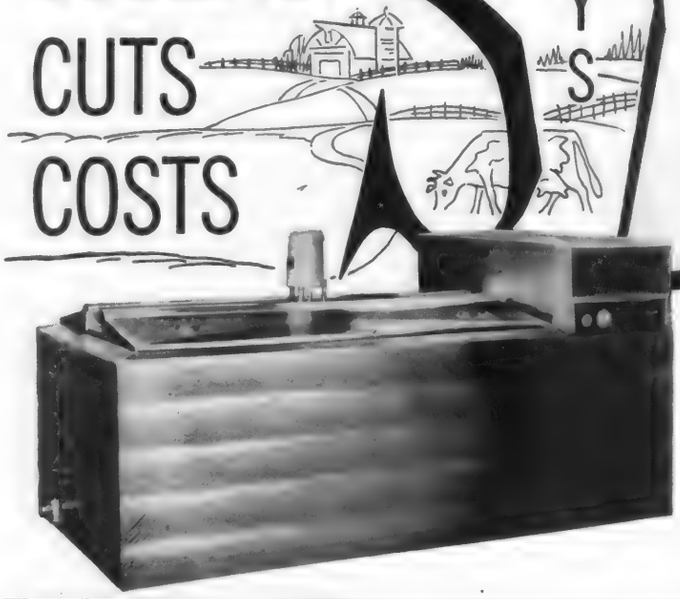

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No more time-consuming can lifting and hauling. Seamless stainless steel construction makes Haverly the easiest cooler to keep absolutely clean. Haverly bulk milk cooling eliminates time-consuming delivery problems, too.

★ **NO MORE MILK LOSSES**

Haverly's emergency cooling feature cools milk properly even during power failures. You can't lose a tank of milk cooled in a Haverly. And Haverly ends losses due to milk sticking to old-fashioned cans. Quality cooling keeps premium milk in perfect condition. Constant creamline cooling protects butterfat content and milk flavor.

★ **LOWER ELECTRICITY BILLS**

Efficient Haverly cooling keeps electricity use to a minimum – enables you to take advantage of off-peak rates. Haverly uses electricity only when new milking is added, brings temperature down to 36° fast. Then copper heat exchangers take over, drawing heat away from the tank – with no need for electricity. And, Haverly coolers don't require a demand meter.

HAVERLY® *The premium quality cooler for premium quality milk*

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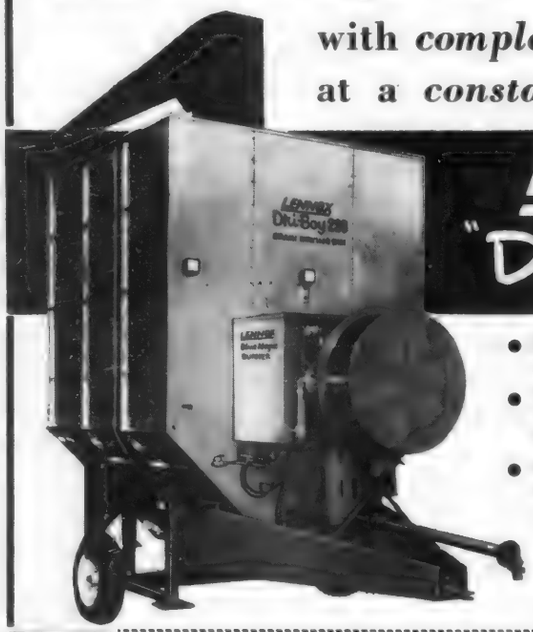
New Grain Dryer at new low price

with *complete* recirculation at a *constant* temperature



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"Dri-Boy 230"

- Completely recirculates 620 bushels per hour with wet grain capacity of about 230 bushels
- Automatically maintains any pre-set drying temperature regardless of outside temperature changes
- Uniformly dries full load of 28% moisture corn down to 13% moisture content in approximately 2 hours

The "Dri-Boy 230"—a more practical grain dryer for small as well as large farms. Temperature never varies over 4°, plus or minus, anywhere in the bin. A downstream fan thoroughly mixes up to 3,000,000 Btu of heat with up to 16,000 cfm of air, using PTO. New "Blue Magic" LP gas burner eliminates fuel waste. Uniform 24" grain columns and sidewalls, with 32% perforated area, take full advantage of heated air. There's no hang up of grain. No wet pockets. Sixteen-gauge skin stressed construction. Complete safety controls. Send coupon TODAY for full details.

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about $20,300. If he incorporates his farm, draws a salary of $10,000 a year from the farm, and leaves the remaining $10,000 in the corporation for reinvestment, his total tax would be $14,520 personal, $3,000 corporation, or $17,520 in all. In addition, he will be protected by the corporation from liability for claims made against the farm, except to the extent of his investment in the farm corporation.

Pitfalls of Incorporation

One of the most important things to consider before forming a corporation is how it can be dissolved. All the advantages and years of tax savings can be washed out if liquidation is not planned properly.

This is most important with the pseudo-corporation because it can automatically revert to a real corporation any time one of the seven requirements is not met. For example, any time a stockholder in a pseudo-corporation sells stock to another person who will not sign a form consenting to this tax-saving arrangement, the corporation immediately becomes a real corporation. This can also happen whenever stock is sold or given to more than ten stockholders, whenever stock is acquired by a non-resident alien, or whenever more than 20 per cent of the annual gross receipts come from rent, interest, dividends, etc.

This automatic reversion to a real corporation can be a very dangerous factor if not prepared for in advance. For example,

even though all the pseudo-corporation profits are passed directly to the stockholders for taxation, this is often a paper transaction only and the actual money is retained in the company for later use or later tax-free distribution. However, if the election to be a psuedo-corporation should be ended either accidentally or intentionally all the undistributed tax-free income is classed as accumulated profits in the real corporation and is again taxable when distributed as dividends.

It is, therefore, very important that every pseudo-corporation have some kind of stockholders' agreement which prevents sale of stock to more than 10 stockholders or to persons who don't consent to the election. If such an agreement isn't binding in your state, then at least you should require that all stock be offered to the other existing stockholders before it can be sold to outsiders. A similar provision should be included in a pseudo-corporation. Unless a will is made out properly to comply with the election requirements, stock may be inherited by non-consenting persons or by more than the maximum number of stockholders, and the pseudo-corporation will be terminated. Also, since a trust cannot be a stockholder in a pseudo-corporation, wills should provide for stock transfer other than through a trust.

Capital gains should also be considered before forming either type of corporation. In a real corporation all gain from sale of property that qualifies as a capital asset is taxable as ordinary income, while in a pseudo-corporation, as in a partnership, only 50 per cent of the gain is taxable so long as total capital gains do not exceed the year's net income. There may be considerable excess capital gains tax if either type of corporation is terminated.

The provision that only 20 per cent of gross receipts can be from rent, interest, etc., should be watched closely in a pseudo-corporation. When ordinary income from sale of crops and livestock varies, it may be hard for some farmers to determine in advance if rent from buildings, farmland and machinery will exceed this limit. Custom work probably would not be counted as rent because the Internal Revenue Service says payment for use of property is not rent if substantial services are rendered.

The possibility of farming losses as far as taxes are concerned should also be checked out before forming a pseudo-corporation. The law provides that you can only pass through to the individual stockholders the amount of loss equal to their basis in the corporation—the value of their stock plus undistributed tax-free income. Any loss over that amount cannot be used.

Losses in a pseudo-corporation can only be carried back by the individual stockholders to 1958; otherwise they can be handled just as in any other corporation or partnership. However, losses accumulated before the pseudo-corporation was formed cannot be carried forward and used during the years you are operating as a pseudo-corporation, but can only be used if the pseudo-corporation is ended before the five-year loss carryover period has expired.

One last important pitfall: in states where community property laws are in effect, a married man who owns stock must also count his wife as a separate stockholder. Therefore, only five families could be included in a pseudo-corporation in those states.

Tax Time

Real corporations pay income tax by using Form 1120 which must be filed by the 15th day of the third month following the end of the corporation's tax year. Pseudo-corporations, though they will not pay income tax, must file Form 1120S during the same period other corporations file their tax returns.

Since types of forms and dates for filing for payment of state income taxes vary with the individual state the corporation should follow the advice of its lawyer or write directly to the State Department of Revenue for information on this point.

The pseudo-corporation is no tax-saving dodge. As a matter of fact, in some cases such as the situation where a corporation is expanding and is able to reinvest profits, the real corporation may have the tax advantage. The pseudo-corporation does permit a farmer to benefit from the advantages of incorporation without the disadvantages of double taxation. It is one more tool to add flexibility to farm management.

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No Waiting for Reports

Make More Money!

No More Guesswork!

Save Up to $15 an Acre on Fertilizer

Increase Profits Up to 300% from Every Acre!

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Guessing costs plenty—wastes both time and money—robs you of the bigger income you have a right to expect. Many farmers use too much of the wrong kinds of fertilizer—not enough of what their soil needs. A Pennsylvania farmer was going to spend $700 for lime but bought a Sudbury Soil Test Kit and discovered no lime was needed. He saved $700 and got better crops too! Your Soil Test Kit will pay for itself many times over!

Easy as Reading a Thermometer

No Knowledge of Chemistry Needed

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Many farmers now spread part of their fertilizer in the fall—there's more time now, the land is easy to get on, and you avoid bad weather planting delays next spring.

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Used regularly by thousands of county agents, ag colleges, vo-ag schools, progressive farmers everywhere. Has everything needed for hundreds of tests. Takes only 10 minutes, costs less than 10¢ a test.

Tells right amounts of nitrogen, phosphate, potash for each field. Also whether lime is needed (pH) and how much. Life-time welded steel chest with carrying handle. Easy instructions show needs of 225 different crops. Weighs only 12½ lbs., can be used out in the fields. Big Value, only **$29.95.**

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—year 'round work horse

hooks up to 22 optional attachments including popular 32" rotary mower, 3-gang reel mower with 5 foot cutting swath, dump trailer, snow plow and all garden tools.

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Wheel-Horse®
THE SUBURBAN YARD and GARDEN TRACTOR

RUSSIAN FARM EQUIPMENT

(*Continued from page* 47)

cylinder gasoline engine in 1954, with a 14 horsepower output. It was changed to a 16 horsepower diesel in 1956. In 1958 they began to produce a 20 horsepower, 2-cylinder, air-cooled diesel.

A second all-purpose chassis is a 65 horsepower model with power steering. We are told that the 1959 model has 75 horsepower. Attachments for this include a combine with hydraulic controls, a hydraulic dump wagon, a forage harvester, a corn and a cotton picker, a castor bean harvester, a manure spreader, a cultivator, and a baler. The model we saw was at a large Machine Testing Station outside of Kiev. It is the Russian answer to the Minneapolis-Moline chassis. The Russians will manufacture 50,000 such combines next year. It has a diesel engine and a hydraulic lift. The combine that fits this uni-purpose chassis can either cut direct, or pick up from the windrow. Most combines now in use are crawler-drawn, and collect straw in a huge compartment, dumping it at intervals. It is then collected and stacked.

There is evidence that until very recently, at least, most of their farm equipment developments were based on progress here and in other countries. For example, they showed great interest in hay conditioners, but to our knowledge have none yet. Another example was their interest in balers and, although they claimed they had 2,000 balers working in Russia, we only saw two small patches of baled hay. However, we did see under development an experimental two-chamber baler, which was to be self-propelled. It was claimed that this would bale hay from 110 to 120 acres a day. The inventor of the two-chamber baler, J. M. Voltov, also designed a 50-foot, seven cutter-bar mower. It was built around a DT 54.

While they are moving forward with certain adaptations and innovations of their own they continue to follow what is being done elsewhere. During our trip we saw several American farm tractors and implements which were being tested and studied. For example, we saw a John Deere plow which was covered with strain gauges, and a new Sheppard Diesel partly dismantled.

We saw several Russian farm machines which bore more than a close resemblance to some very familiar United States equipment. The DT 54 looks more than a little like a Caterpillar. We saw an elevating buckrake, which was built on a 1920 vintage Farmall

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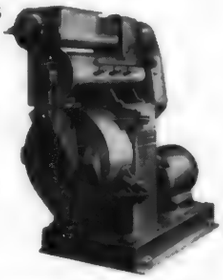

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Offered in two models: The Model AM as shown. Also, the Model H, without mixer, base or motor, which is available for as little as $4200. Choose from the complete CPM line. *Write Dept. FQ*

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"F 20" tractor, and the Byeloruss tractor which is made at Minsk bears a very close resemblance to the Farmall "M". The self-propelled chassis idea was begun by the German Lanz firm. The milking machines that we saw were similar to 1930 to 1935 model De Laval, although 88 per cent of all the cows in Russia are still milked by hand, and all are milked by women. The Russians claim they have 1,000 installations of milking parlors, although we question this. We saw only 2 or 3 bulk tanks. I saw very little barnyard mechanization, apart from a limited amount of research work.

Farmers or mechanics have little influence on inventions in farm mechanization. It is true that some of their ideas might be considered, but it is mostly handled from the top down. Many important ideas for farm machinery in the United States have come to engineers through individual farmers, who often work out arrangements with manufacturers to develop their ideas and place them on the market. This type of system has very little opportunity in the USSR. This is a real problem of their type of economy.

Another striking feature of the Soviet system is the extremely poor marketing facilities. In the cities great lines of people are found everywhere waiting to buy bread, other foods, or almost any article. It is very troublesome to buy food as it is any other commodity in the USSR. After waiting in line you find what you want, determine the price, and go to another line where you pay a cashier and get a receipt to take back for the goods.

Transportation is one of the real bottlenecks in the development of the Soviet Union. Most of the roads are not paved, other than the main roads from one city to another. We were told that they had about 1/16 as many miles of paved roads as the United States, but I think this might be on the high side. For any great distance most of the food, or other products, must be shipped by rail. Lack of refrigeration and inadequate processing facilities make seasonal fruits and foods available only in season. This means each general area must be more or less self-sufficient except for the most important crops, such as grains, for bread. This prevents regional specialties. Much of the fluid milk is produced within 25 to 40 miles of cities and is sold as fluid milk, but in the outlying areas cream is made into butter or cheese, and skim milk is fed to livestock.

We flew to Siberia on a commercial airline, then by special railroad car provided by the regional government we made an overnight trip to the heart of the new lands. Two successive nights the drivers of the cars that took us to the railway station appeared in the same cars next morning, and drove us around on that day's tour. Apparently they had driven most of the night over very rough roads to arrive in time to meet our train the following morning.

The new lands are about 100,000,000 acres of virgin land in middle Siberia near outer Mongolia which has been brought into cultivation since 1954. It is all in state farms. They grow large acreages of wheat and are as yet using little fertilizer. They also grow potatoes and are trying to grow corn, principally for silage. Time and again we were struck by emphasis placed on crops not well adapted to local conditions. It seemed that orders had been sent out from Moscow to grow this or that, and so specialists went to work to see what they could do in local conditions. One example is the growing of apples in Siberia. The tree top is cut off, branches are trimmed and staked to the ground, and no part of the tree grows more than 18 inches high. These low-lying trees are covered with snow to help them survive the severe winters.

One is struck by the wide use of shelter belts, whether it be in the Ukraine or in the new lands of Siberia. Millions and millions of trees have been set out primarily to arrest wind erosion. Most of the shelter plants are deciduous trees rather than evergreens.

We must face up to the military threat from Russia. But more than this—if we are to preserve what we cherish about our American way of life we must face their challenge to our basic philosophy of individual initiative, freedom of enterprise, service to our fellow man and faithfulness to God. The Soviet alternative is subservience to the state, and worship of political leaders.

The Communist leaders are dedicated to their cause. They glean the world for ideas and technology that will push their cause forward. Our challenge is to stay out in front in ideas and human progress and do it within the framework of a free society.

THE AUTHOR: Dr. Butler is Farm Counselor for AVCO Corporation, and a member of the American Society of Agricultural Engineers.

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BOX 185 PENDER, NEB.

NEW PTO SPEED STANDARD

(*Continued from page* 67)

shaft. Or, it will transmit the same horsepower with only about half the torque.

The committee chose the high speed pto rather than the bigger shaft at the 540 speed. Champions of the 1,000 rpm argue the bigger shaft would mean bigger and heavier bearings not only on tractors, but on all drive assemblies. (The opposition agree, but say each bearing would cost only a dollar or two more. They felt less confusion would result if the same speed were kept.)

At this point, the two sides compromised by agreeing that the two standards, 540 and 1,000, should exist side by side. Whatever the merits of either speed, they won't approach the levels of confusion that will arise from two standards. More than a few dollars have been spent already by the two tractor companies which were first to offer the 1,000 rpm speed (Ford and John Deere). Soon to follow will be Oliver, International Harvester, and Case. Minneapolis-Moline, Massey-Ferguson, and Allis Chalmers have not yet said when (or if) they will offer the 1,000 rpm pto.

If an old tractor cannot be internally converted to a 1,000 rpm pto, and a farmer needs the high speed shaft, he is put to a lot of trouble. He must use an external gearbox, which has several disadvantages. For this reason manufacturers are loath to change transmissions in such a way as to make old models obsolete.

Duration of the Dual Standard

The engineers hope farmers will gradually adopt the 1,000 rpm standard, and it will replace the 540 speed. Since tractor or implement life can vary widely, this is bound to be a slow process. Even if the 540 standard were to become unpopular tomorrow, there would still be machines with this pto speed in use in 1970. But no manufacturer is going completely to 1,000 rpm, and several companies are not yet offering the high speed pto. So we are going to have two standards for at least ten years. As long as any major producer holds off the 1,000 rpm, that will prolong the change.

This is going to be a major headache for every farmer when he buys a new machine. Sometime in the next few months, when it is your turn to visit a dealer, you should know the answers to some of these questions:

What is the difference between the two standards?

The 1,000 rpm pto can transmit more power through the same diameter (1⅜ inch) shaft with the same torque. The new pto shaft is one inch shorter, and has 21 round-topped splines instead of the six flat-top splines of the 540 standard. Some position and tolerance changes on the 1,000 rpm should make hitching easier on the knuckles, and keep the shaft more nearly

straight, with less strain on the universal joints. In addition, the rotating safety shield will be standard on all 1,000 rpm pto's.

Which should I buy—1,000 rpm or 540 rpm?

It depends on your machinery-buying plan. It is best to keep one speed and one only on each farm, unless you have two or more tractors. If you are starting today with all new equipment, buy 1,000 rpm. If you have only one or two pto-driven tools, and need a new tractor, consider a trade. First check with your dealer to see if the implements can be converted to 1,000 rpm. Trade the ones you can't change with the tractor, replacing the whole line with 1,000 rpm machines. (Some machines are being sold which can be run at 540 or 1,000; for example, New Idea's hay conditioner.)

What if I can't make the change all at once?

Plan out your machinery buying as far ahead as possible. Include all replacement buying. Decide the best time to convert to 1,000 rpm; this is usually when you are trading the most expensive tractor or implements. A farmer with two tractors has the problem partially licked, as he can have one on each speed as long as necessary. Discuss it with your dealer. He should help you plan, and be ready to make a good offer when he sees planned future sales.

If I have a choice of times, when should I change?

With absolutely equal choices, take the early date. There is the chance the 1,000 speed will not click, but that risk is less than to be caught with 540 when everything

OLIVER Model 101 Baler, made by The Oliver Corporation, Chicago, Ill. Baler is powered by Model VG4D Wisconsin 37-hp. V-type 4-cylinder air-cooled engine. This 3-wire baler is capable of handling 20 tons of hay per hour, enabling farmers to speed up haying operations. Bales of any length from 20 to 50 inches can be produced.

BESLER Sprayer, made by Besler Corporation, Emeryville, California. Powered by a 2-cylinder Wisconsin air-cooled engine. Powerful spray jets cover low-hanging, as well as high branches for most effective insect control.

OK CHAMPION Two-Row Potato Harvester, made by Champion Corporation, Hammond, Indiana. Powered by Wisconsin V-type 4-cylinder air-cooled engine. Harvester features include: minimum headlands for turning; variable speed control for elevators and conveyors; 3 speeds forward and reverse gear transmission.

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. . . save time, labor, money and storage space

Capacity to match either one or two-row corn pickers makes the new Haban Field Husker-Sheller a sensation in cost-saving corn harvesting and handling. Hooking between picker and wagon, it husks, shells, cleans and delivers the shelled corn into wagon box. Send for catalog.

NEW . . . Haban FIELD HUSKER-SHELLER

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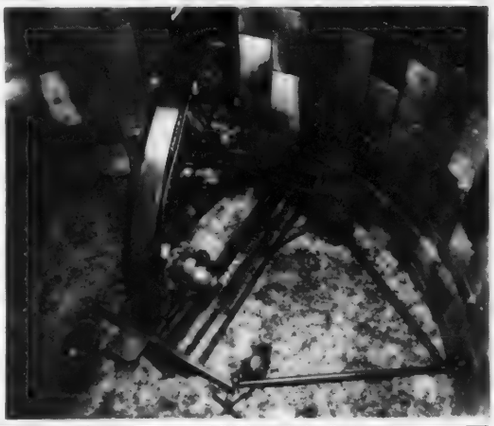
NOW . . . push-button silage handling with the NEW PAPEC NO. 50 SILO UNLOADER

No more hand pitching. No more climbing into the silo every time you feed. Just push a button and start silage on its way to your cattle.

That's the kind of *labor-saving* performance you get with the NEW Papec No. 50 Silo Unloader. With it you can handle loose or hard-packed grass, sorghum, and corn silage. Frozen silage is no problem either, since you can equip the auger with heavy-duty ice cutters.

Your PAPEC No. 50 Silo Unloader is easily moved; it has automatic leveling to insure even unloading; and the tractor-type wheels provide the positive traction needed for smooth, sure operation.

It costs just pennies a day to operate. It's the perfect answer to your feed handling *system* needs. See the new PAPEC No. 50 Silo Unloader at your dealer soon.



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POWER CHORING CHECK LIST

to find out how Jamesway push-button equipment cuts your chore-time costs and labor

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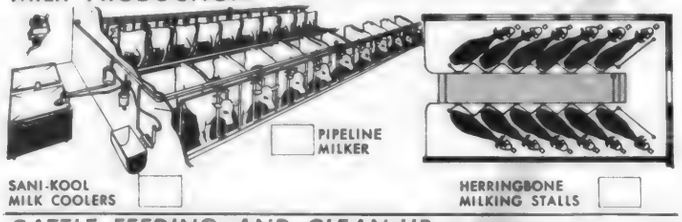
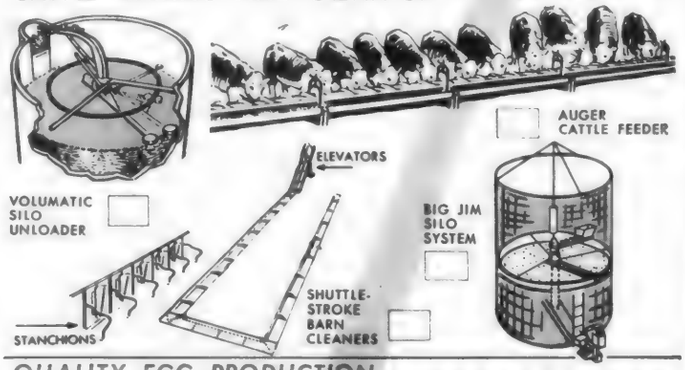
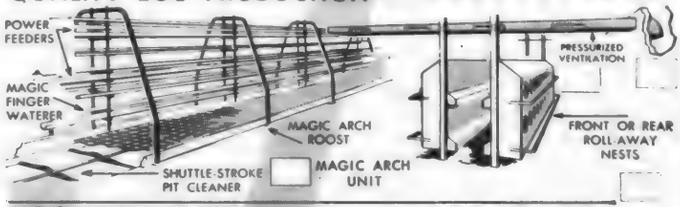


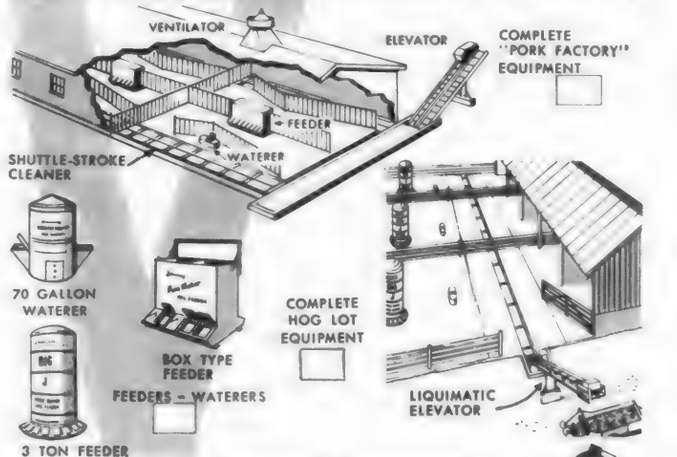
CATTLE FEEDING AND CLEAN-UP



QUALITY EGG PRODUCTION



HOG PRODUCTION



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new is 1,000 rpm. Also, as 1,000 becomes more common, the trade-in value of a 540 machine will be less. Hence a 1,000 rpm machine bought now will tend to keep its value longer.

Will 1,000 rpm cost more than 540?

There should be very little difference in the initial cost of a tractor. Implements vary. Some will cost less.

Does tractor size make a difference?

Yes. If you are buying a big tractor, if it is not 1,000 rpm, be sure it will convert to 1,000 rpm internally, without great cost. When the high pto speed becomes popular, implements are bound to appear with bigger power requirements. You don't want to be caught with a tractor that can't work the implement without a costly conversion. With a small tractor, the 540 rpm pto will handle all the power the tractor transmits.

Can I convert my present tractor from 540 to 1,000?

Yes. Most tractors can be converted with an external gearbox. This is not as good as an internal gear change, but the internal change is not possible on all model tractors. The external gearbox fits over the 540 shaft, and gears speed up the shaft to 1,000 rpm. The multi-spline, high speed shaft comes out of the external gearbox at the same level as the tractor shaft, and about nine inches back.

Can I change 1,000 rpm back to 540?

Yes. The first 1,000 rpm pto's will be converted from 540 machines. As the 1,000 rpm speed is generally accepted, the change back to 540 will not be desired, and then some unchangeable machines will no doubt appear. The internal change means the 1,000 shaft replaces the 540 in the same bearings. A small change to the hitch is necessary with the external gearbox, and may be necessary with the internal change.

What will internal conversion cost?

Models will vary. On some John Deere and Oliver models, costs are as low as $25 for parts. Labor may double this, but a well-equipped farm workshop could handle the labor in simple cases. Where a bigger change is involved, and the tractor must be split at the flywheel housing, more labor is involved. Old Ford models

Arps half-tracks

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- GREATER DRAWBAR PULL
- GREATER FLOTATION
- GREATER STABILITY FOR YOUR WHEEL TRACTOR

. . . All 4 crawler-tractor benefits for less than $500

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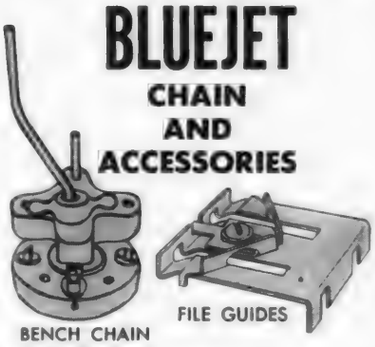
Here's a winning combination that loggers are teaming up with all over the country.

PENFIELD "WEAR TOUGH" guide bars, the standard of the industry.

BLUEJET CHAIN, the fast cutting, smooth-running chain, with the all-new router design.

Advanced design, careful manufacture, and the finest steels are your assurance that these replacement parts are the best. You'll **feel** the difference!



BENCH CHAIN BREAKER and RIVET SPINNER

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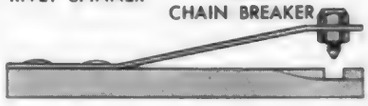

SPROCKETS

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cannot be converted, but the most convenient conversion from 540 to 1,000 is optional with Ford's "Select-O-Speed" transmission. It takes less than a minute. A lever is changed, and a new spline inserted after the 540 spline is pulled out. Other manufacturers have not released cost estimates, but they should not be expensive. On implements, conversion varies. Some may involve gear or gearbox changes; others, like mower or corn picker, may only need a different pulley and belt.

Which models can be converted internally?

Again maufacturers differ. They go back to the following years on *most* models (for accurate information see your dealer): Oliver, 1947; John Deere, 1952; Ford, no internal change possible. Minneapolis-Moline, International Harvester, Allis Chalmers, Case and Massey-Ferguson have not yet announced any models with 1,000 rpm, so as yet only external gearboxes can be used with these makes.

What will an external gearbox cost?

Perhaps $125 to $150. The better boxes can be turned end for end, to get 540 rpm from a 1,000 pto, as well as 1,000 rpm from a 540 rpm pto. A few gearboxes have a low speed reverse gear incorporated. This can be useful, but check if the implement is meant to reverse. Many worm drives, chains, belts, and gearboxes will not run backwards without damage. Don't use a gearbox which converts to a non-standard speed, like 750 rpm. Stick to 540 or 1,000.

26% INCREASE IN ONE YEAR WITH BUCKEYE GRASS INCUBATOR

HOLSTEINS

Melvin Wills, owner of a Holstein herd near Middletown, Ohio says of his Buckeye Grass Incubator, "I've operated it continuously for 12 months since April 1958. We sold $1660.00 more milk with the same number of cows than the year before. This represents a 26% increase in money. My veterinarian bill is just about half . . cows are healthier and better producers. 90% of my cows are being settled on the first service. I'll always feed Buckeye grass every day of the year."

HERE'S PROOF

HERE'S PROOF

JERSEYS

Edgar Smoot, large Jersey Breeder in Utah says, "Since feeding my cows green grass from the Buckeye Grass Incubator, I find almost every one of them on DHIA Reports producing more butterfat. Their condition is excellent. I can see a big difference even in the calves that are getting green feed. The Buckeye Grass Incubator is proving one of the best investments in our operation."

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Hydroponics Division
BUCKEYE INCUBATOR CO.
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Without obligation, send literature to:

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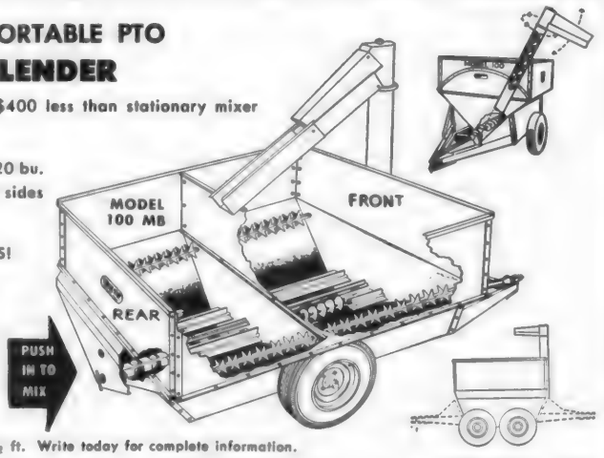
AT LAST! A TRULY PORTABLE PTO
FEED MIXER-BLENDER

- LOW COST! At least $200-$400 less than stationary mixer of same capacity.
- 6,000 LB. CAPACITY! Holds 120 bu. —145 cu. ft. with extension sides and tandem axles.
- 5 FORCE FEED MIXING ROLLS!
- MIX TO COMMERCIAL STANDARDS ON YOUR FARM.



Also available as attachment—buy Model 100 auger box now, add mixer-blender kit later. Converts also to bulk delivery unit — discharges any height from 33 in. to 16½ ft. Write today for complete information.

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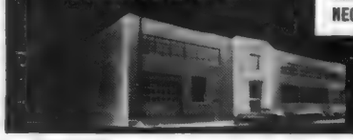

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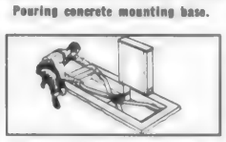
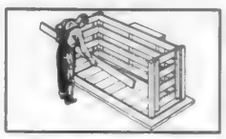

Assembling scale in base.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What are the disadvantages of the external box?

First, an external box used to speed up 540 rpm to 1,000 still has the weak link, the 540 shaft. If the 540 shaft was too weak to power an implement, adding a gearbox won't help. This may be a problem with newer heavy machinery. Secondly, an external box can't be used on mounted implements without some adjustment. On some implements it will not fit at all. The altered position of the shaft affects the linkage. Some boxes will not take side loads such as a pulley to drive a mower or saw—because the bearings are not heavy enough. A more expensive box, with stronger bearings is needed. Lastly, there is some power wasted in an external box.

Savings

Will the 1,000 rpm save me anything?

Probably a little over all. The main rotating components of pto-driven machines vary widely in speed, from below 540 up to 2,700 rpm. For some, like corn pickers, manure spreaders, hay crushers, side delivery rakes, the 540 speed was good. An opposite extreme is a hammermill. But probably the average is nearer 1,000 than 540. For example, with 1,000 rpm pto, the model 20 Grainovator self-unloading wagon will cost $60 less. The 1,000 rpm will be useful for V-belt drives, as a smaller pulley can be used. A V-belt has a minimum efficient speed in feet per minute, and the high speed shaft provides this with a smaller pulley (14-inch pulley gives 2,000 feet per minute. With 540, a 7⅝-inch pulley gives the same with 1,000 rpm).

Are there any machines now which must have 1,000 rpm?

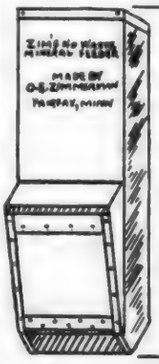
Possibly only large forage harvesters, such as are used for custom work. Most hammermills and large irrigation pumps can use all the power you can give them. And the machines needing 1,000 rpm will increase.

Will 1,000 rpm wear out faster?

No, on the contrary, the 1,000 rpm shaft is smoother running. It will have less vibration and less "whip." This will mean longer life, as well as smoother running implements.

Can I run a 540 implement at 1,000 rpm and get faster ground travel?

No, no, no. This is extremely dangerous.



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Livestock shelter plus feed storage—*Open shed for shelter and feeding is combined with totally enclosed area for hay and grain storage. A 48' x 48' Stran-Master like this, in Stran-Satin Color, takes an initial investment of only 25% down on five year purchase plan.*

Machinery storage plus repair center—*Partly open side provides easy access to spacious storage area. Repair center and tool shop is in enclosed section at left. Initial investment of only 25% down for this 48' x 64' Stran-Master with choice of six colors.*

Stran-Master, priced at less than many wooden pole barns, now offers a choice of six rich colors that last for years and years: blue or bronze, grey or green, rose or white. Use them separately or in any combination. The factory-applied colors are baked on to the zinc coated steel panels in double layers of vinyl aluminum to make distinctive farm buildings that keep their colorful good looks without costly maintenance.

The multi-purpose Stran-Master serves any farm storage or shelter need . . . ideal for stanchion barns or livestock loose-housing. Specialized buildings are also available for grain storage or for any hog or poultry production requirement. Any size or design can be erected in a few days by dealer's crew or your own. Mail coupon or contact your nearest Stran-Steel dealer for more information.

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Send the new Stran-Master catalog and information on Stran-Satin Color. I'm interested in a building approximately _____ ft. x _____ ft. to be used mainly for _____

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The implement might literally fly apart from the increased strain. Second, the life would be very short—bearings and gears designed for one speed wear fast when the speed is doubled. Third, the machine may not work at all—for example, a chopper with pipes designed for one feed rate would block up if the rate were doubled, or a combine might put all the grain on the ground. Finally, the safety factor is reduced. An external pulley designed for 540 may be fatal if it catches in clothing at 1,000 rpm, and any balancing of rotating or reciprocating part would be wasted. On the other hand, machines designed for 1,000 rpm should be safer because they vibrate less, and because smaller shafts, chains, gears and pulleys can be guarded easier. *And, most important of all, neither a dealer nor a farmer should accept anything less than a safe, adequately covered hookup.*

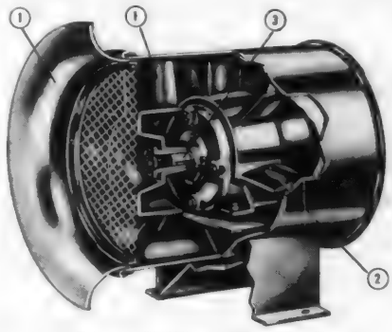
Millions of dollars already have been spent in introducing the new, high speed pto. Millions more are going to be spent if the consumer accepts it.

The changeover could be an accursed nuisance to many farmers, perhaps most of all to those who bought a tractor recently without planning for 1,000 rpm pto's. But there is no change without inconvenience—and this is change for the better.

QUIET CROP DRYING FANS

Chicago Vane Axial Fan moves MORE AIR with 60% LESS NOISE and here is why:

1 Aerodynamically shaped inlet and airfoil blades move more air with less turbulence.
2 Air vanes straighten and guide air flow.
3 Direct connected fan and motor provide trouble-free operation.



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Chicago Crop Drying Fan and Warm Air Heater clamp together to form one integral unit.

- Low equipment cost per btu.
- Wide heat range.
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- Uses less horsepower • Low initial cost
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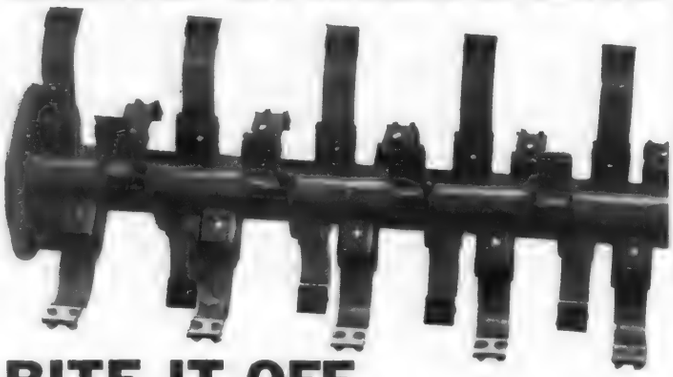
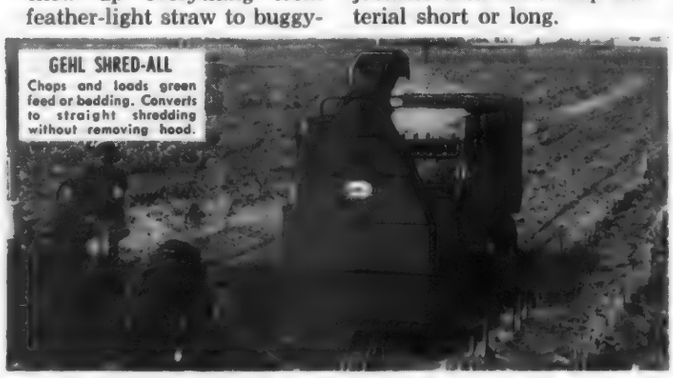


BITE IT OFF...

Gehl's shredders make mincemeat of the toughest chopping, shredding, and clean-up jobs on the farm. This battery of rugged, razor-sharp swinging knives tackle everything from green feed to clearing heavy brush. Tips of cutting blades are reversible for double life.

CHEW IT UP...

You don't have to hold back when you head trash into the teeth of a Gehl. They'll chew up everything from feather-light straw to buggy-whip saplings. Full 5-foot cut takes a giant-sized bite that short-cuts any job. Adjustable shear-bars chop material short or long.



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Gehl's "lift and cut" action trims right down to ground level . . . leaves fields clean as a hungry hound's plate. Hand crank or hydraulic lift lets you control cutting height. Optional front-hinged baffle kicks out stones . . . keeps in the crop for finer shredding.

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THE CARE AND FEEDING OF WET CORN

(*Continued from page* 87)

relieved by the breather bag are handled by a pressure-vacuum relief valve which works on the same general principle as the safety valve on a steam boiler or water heater.

Two manufacturers of galvanized steel and one of concrete stave silos have come out recently with structures for airtight storage. The interior of the concrete silo and the joints between the staves are sealed with a coating of epoxy resin, and a reinforced concrete roof is used to make the structure airtight. On these structures, pressures and vacuums are relieved by a valve without a breather bag.

The newest idea for keeping airtight storage at zero pressure and eliminating all danger of air being drawn in at a low level is an experimental scheme we have devised here at Purdue. A tube or pipe is run from the top of the silo to an empty 55-gallon drum; another tube leads from this drum to a second one; the second drum is connected in like manner to a third, and so on for a series of about 6 drums, depending upon the size of the grain storage. When the carbon dioxide at the top of the storage space expands, it descends the tube into the first drum, pushing the air out into the next drum, from the first drum the gas pushes into the second and so on, progressing as long as the pressure behind it is maintained. When the gas in the storage space contracts, carbon dioxide rather than air is drawn up the tube from the drums. In this way no air is ever introduced into the silo while the grain is in storage, as long as the breathing of the silo does not exceed the capacity of the barrels. The pressure in the structure remains at zero, even if the capacity of the breathing chambers is exceeded, at which point air is introduced into the structure but only at the top.

Getting high moisture corn into the airtight silos poses no special problems, with one exception. If shelled corn is put in with a blower the blower should be run as slowly as possible. If the blower is run too fast the kernels will be cracked. This cracked corn will not spoil as readily as the whole kernels while it is in the silo, but it will spoil quicker than the whole kernels when put in self-feeders. Cracked corn will also bridge badly over unloading augers that are commonly used in airtight storage.

One enthusiastic feeder of high moisture corn almost deserted the ranks after his first experience. "If you want to see a mess," he says, "combine a field of 30 per cent moisture corn and put it in the silo with the blower revved up to top speed. We did it but we'll never do it again."

This farmer now uses a vertical bucket elevator to fill his two airtight silos with shelled corn, and waits till the crop is well below the 30 per cent moisture mark. The silos stand side by side with the elevator installed permanently between them. A pipe on a swivel at the top of the elevator permits the operator to direct the grain to either tower. The initial cost of a bucket elevator is high but its power requirements are low. A one or two horsepower electric motor can easily handle one, particularly if a large enough dump pit is built so the elevator can fill the silo at a leisurely pace while the wagon returns to the field.

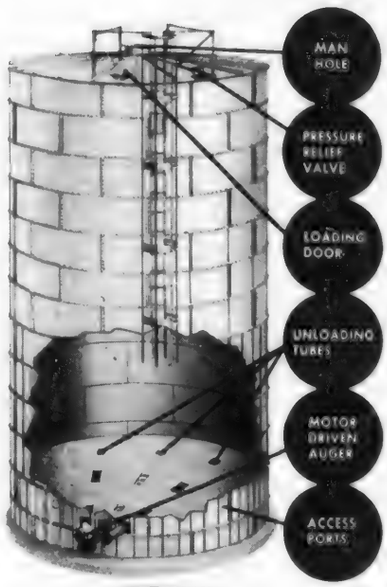
And, of course, that workhouse of dozens of jobs, the chain elevator, can also be used for moving corn from wagons to silo.

The best angle of elevation for an all-purpose elevator handling silage is about 45 degrees. At that elevation delivery height is 7/10 the elevator length. Extra length must usually be provided, however, since the ground usually slopes away from the base of the silo and the elevator should extend well over the edge of the silo.

The problem of getting ear corn, or shelled corn into the larger diameter silos with top center opening has been solved by using slower speed blowers (which can be run as slow as 1370 rpm) with a fan of larger diameter (24 inches) and by using 22½ degree elbows in the pipe to produce a slow, gentle curve for the material as it is blown into the silo.

For getting the corn out, the airtight silo must be equipped with some form of mechanical unloader which can be sealed when it is not in use. The chain type unloading conveyor with which the glass-lined silos are equipped works as well with either ground ear corn or shelled corn as it does with forage silage. Auger unloaders may also be installed.

The auger unloader can be used only on shelled corn. Other



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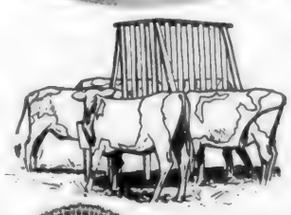
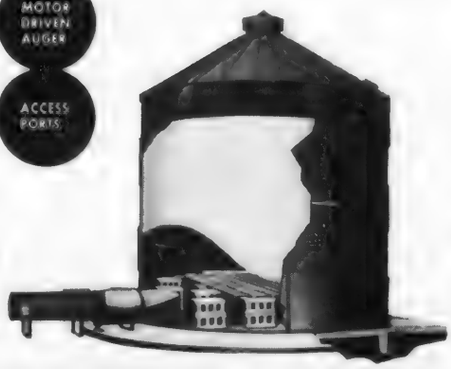
Grain Conditioning systems are profit makers, too. Forced conditioned air drying for high moisture grain. Bins are designed with exclusive C&L perforated floor and blowers that allow the grain to dry automatically, continuously and uniformly. **Ask the C&L dealer in your area for the newly revised "Grain Marketing Digest."**





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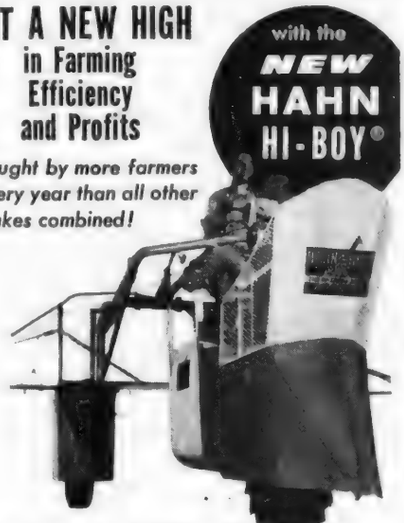

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silage materials and ground ear corn tend to bridge.

Shelled corn does not bridge seriously if it was not cracked badly during loading into the silo or if it is not above 30 per cent moisture content. A half load or so of dry grain placed over the auger before filling the silo with the high moisture material will help start the flow of the corn on the initial unloading. Removing a few bushels every week or two during the storage period will also prevent the building up of bridges.

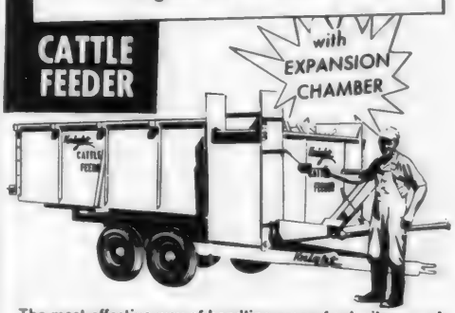
The new galvanized steel and the concrete silos are provided with two or more horizontal auger tubes imbedded in their floors. Each of these tubes has three or more openings along its length, any one of which can supply corn to the auger. If one bridges, it is likely that another will supply corn. The outlet of the auger is fitted with a cap so it can be sealed airtight.

And here must be included a most important word of warning. DO NOT ENTER THESE AIRTIGHT SILOS. If you must go in for any reason wear a gas mask with a hose connected with oxygen or the outside air. Always have a companion at hand outside the silo. And wear a safety belt strong enough that your companion could pull you out with it. To clean out the last bit of corn the unloaders cannot remove, one manhole at the bottom of the silo and another at the top can be opened to aerate for several hours before entering.

THE AUTHORS: Dr. Gerald W. Isaacs is associate professor of agricultural engineering at Purdue University. Ira J. Ross is an instructor in agricultural engineering at Purdue and Dr. Isaacs' co-worker.

KNIGHT IMPLEMENTS
Engineered for Better Farming

CATTLE FEEDER with EXPANSION CHAMBER



The most effective way of handling green feed, silage, and supplements. A PTO powered front end unloader with all steel construction. The "Expansion Chamber" feature is an area that is wider than the rest of the box which allows the compressed green feed to expand so that it is easily unloaded. The detachable elevator operates in a 90 degree arc. Model 12 and Model 15.

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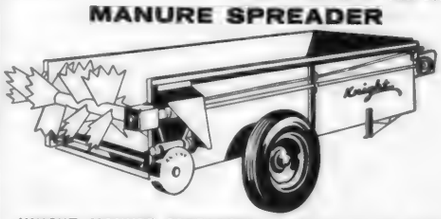

KNIGHT MANURE SPREADERS—PTO driven, all steel spreaders feature low silhouette and heavy duty construction. Upper beater available. Model 66 is 110 bus. cap; Model 88, 135 bus. cap; Model 130 (truck mounted), 225 bus. cap.

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SAYS ARTHUR J. WORKMAN
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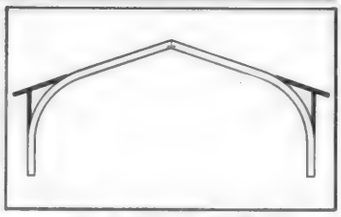

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ONE FARM VERTICAL INTEGRATION

(*Continued from page* 79)

grated from the first. Volume and quality have been added in 36 years, but the formula is the same—hard work and attention to detail. Walter Rawl and his wife were able to handle the produce from the 60 acres without much trouble, but as fields were added, peach orchards planted, and crops diversified, responsible help was added. The Rawls provided the responsible help in seven children. The Rawl family is often called the "workingest family in South Carolina."

One son has charge of all machinery; another is the "pitcher" who assists his father in management; one of his daughters keeps the books, another has charge of the packing plant. Even the youngest, Joyce, twelve, runs a roadside stand which does a booming business. Mrs. Rawl has charge of the field crews which pick the peaches and gather the vegetables and pack the plants.

With his integrated family Walter Rawl is able to place each division of management in responsible hands. This, he says, is the secret of success in a large integrated operation. "One man could not possibly keep all the details in his own head," he says. "I have over-all management, but I couldn't operate without my family. A man good enough to supervise a division of an operation of this kind has a farm or business of his own. I couldn't hire him."

Rawl not only has integrated his farm, but his credit and marketing as well. He was a partner in organizing the Lexington bank, which gets most of his loans. "Sound credit is necessary for an operation of this kind," he says. "I started with a loan and when I was buying land and expanding I borrowed a lot of money—nothing big at any time, but I always owed money. Between crops, or when I am buying supplies for the cannery, I use considerable loan money now."

Rawl's farm is literally integrated from the seed to the housewife's table. He raises all his collard seed and millions of sweet potato, tomato and collard plants, selling wholesale what he does not use. He has two acres in hotbeds. The vegetables and peaches, both canned and fresh, are packed and shipped to jobbers by truck. He has two retail outlets, a roadside stand and a large store area in the Columbia market, as well as retail stores which buy direct.

Rawl has found a way around about every problem that plagues the American farmer. Surpluses are unheard of in his operation. He sells fresh everything he grows as long as the market offers a profitable price. The moment the market weakens, he pushes the button on his canning plant. To keep his plant going and to help out neighbors, he contracts for about 100 acres of tomatoes each year, buys other direct. He does a big business in cooling peaches, charging 12 cents per half bushel for cooling and loading.

Since 1948, when Rawl put in irrigation, drouth has been no problem. "Irrigation," he says, "has added a quarter-inch to our peaches, which means a 20 per cent increase in production and a dollar a bushel more for higher grade on the market."

Frost, too, has been tamed. By offering to haul them away, he has built up a stack of old automobile tires near his orchards. When frost threatens he scatters the tires throughout the grove, ignites them with gasoline, and produces a perfect smudge.

During the peak of the packing and canning season, Rawl employs about 250 people. He has fifty year 'round employees.

Rawl plants no crops which come under quotas or restrictions. His is a free market. While both his canned and fresh products are subject to government grading regulations, he raises as much as he wants to and trims his operation to his anticipated market.

The farm and the packing plant represent $400,000 gross income: 200 acres of collards; 50 acres of sweet potatoes; 6,000,000 tomatoes a year. Contributing are 40,000 bushels of peaches from 200 acres; sweet potato and cabbage plants; and smaller acreages of okra, corn, and seed crops.

Walter Rawl is a big man with a soft and deliberate way of speaking and the Roman nose of the born administrator. They say, "Some people may envy his success, but he hasn't an enemy anywhere."

ALBERTSON'S POULTRY

The farmers who are finding a sales outlet for their product are making news today, but the trend works both ways. There are

TWO PROVEN *Taylor* TOOLS TO INCREASE YOUR PROFITS FROM GRASS

Pasture Dream®

America's Pioneer Sod Seeder

Obtain maximum production from your present pastures with this performance-proven sod-seeding tool. Whether you graze, feed green chop, or make silage from your pasture, sod seeding with the Pasture Dream can increase the output of your present acreage . . . even double it, in many cases!

The Pasture Dream will make it possible for you to:

- ★ Plant grain, fertilize, and band seed grass mixture — in one operation.
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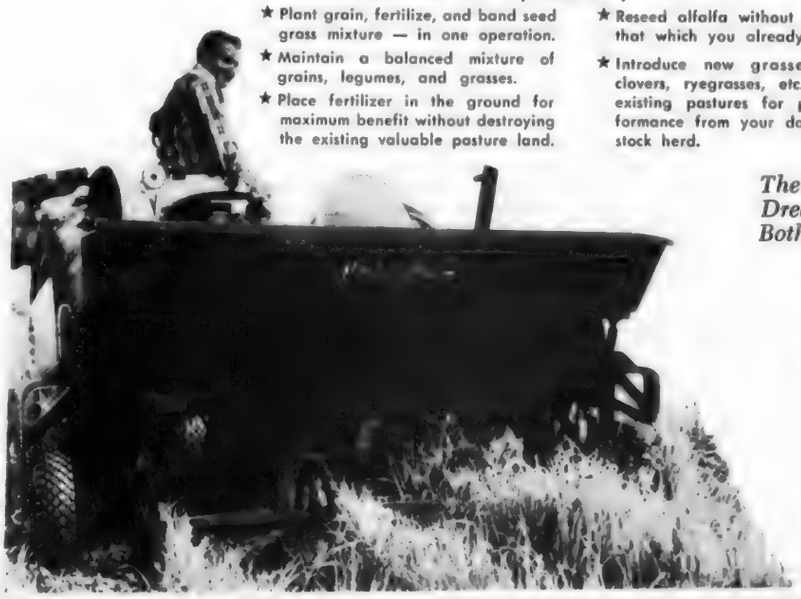
- ★ Introduce new grasses such as clovers, ryegrasses, etc. into your existing pastures for proven performance from your dairy or livestock herd.



Pasture Dream CLIPPER

Taylor offers a complete line of high-quality rotary clippers. Cutting widths are available from 4' to 11'-6". Pasture Dream Clippers are unexcelled for mowing, clipping, cutting, and shredding.

The same Taylor Quality goes into both the Pasture Dream Sod Seeder and the Pasture Dream Clippers. Both tools are sturdily built to give long service.

New illustrated booklet, "Better Pastures Through Sod Seeding", is available upon request. Write us for your copy.

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MACHINE WORKS

LOUISVILLE, MISSISSIPPI

TMW

merchants who are going into farming to supply their own stores with agricultural products. One of these is J. W. Albertson whose single store in Boise, Idaho, in 1939 has grown into a chain of over 50 supermarkets throughout the Intermountain country.

The Albertson company moved gradually into poultry; from retailing, to processing, and finally to operating their own farms. Prior to 1958 the company had operated a poultry plant at Nampa, Idaho. Poultry purchased locally was killed, processed and packaged and then shipped to Albertson's retail outlet. This system had its drawbacks.

What was necessary to produce a uniform, quality bird, Albertson decided, was an integrated operation where quantity and quality control could be exercised from egg to the point of purchase. Work in setting up the operation began two years ago. Integration was completed about a year ago.

These are the results: (1) In 1959, Albertson's will market 1,560,000 broilers, 250,000 broad-breasted-bronze turkeys, and 50,000 Beltsville Whites. (2) They are achieving a 3¼ pound broiler in eight weeks. Feed conversion ratios in broiler flocks have been reduced to a commercial average of 2.24 pounds of feed per pound of gain, with a spread from 2.01 to 2.35 as against a national USDA average of 2.6 to 2.8. (3) Albertson expects to harvest the current broad-breasted-bronze crop this way: hens at 19 weeks with an expected kill weight of 14 pounds; toms at 22 weeks, expected average weight 26 pounds. Conversion weights on the bronze figure out to 3.7 for toms and 2.8 for hens. These are flock averages. (4) On Beltsville Whites, the conversions are running 3.3 pounds of feed to each pound of weight gain. This year the company is marketing a roaster-fryer averaging 8¾ to 9 pounds in 14 weeks. The average rate of growth for Beltsville Whites is 7 pounds at 14 weeks.

Albertson attributes these results to constant and careful management; the latest in automatic equipment; high quality feeds; and high quality feed supplements.

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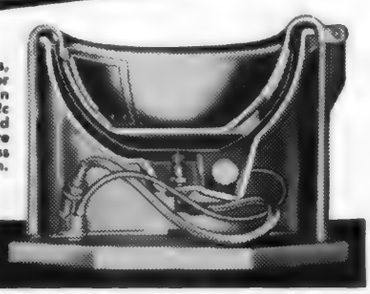

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Your Name and Address

As part of their effort to achieve the remarkable feed conversion rate, Albertson had one of the nutritionists for the Nopco Chemical Company of Richmond, California, prepare some 20 vitamin-mineral premix formulations which are added to the broiler and turkey feeds at the rate of approximately 10 pounds per ton of feed.

These Nopco fortifications are so arranged that, at various times, bronze turkey males are given a variety of nine different protein levels. Hens get nine assorted formulas and Beltsvilles are fed four levels. In addition, at least four different levels are fed the broiler crop aside from the special formulation starter mashes.

At Nampa, Idaho, feeds are mixed in the new $300,000 Albertson mill. This year, it is estimated some 4,000 tons of shelled corn plus 1,000 tons of ear corn will be run through the mill. The basic ration to which the supplement is added includes oats, corn, barley, rolled oats, sun-cured alfalfa, fish meal, meat scraps, dehydrated alfalfa, and soybean meal.

The supplement itself contains Micratized vitamins A and D, vitamin E, riboflavin, niacin, calcium pantothenate, choline chloride, vitamin B_{12}, procaine penicillin, manganese, iodine, iron and copper.

Birds to consume this feed are produced at the Albertson hatcheries at Nampa, where 24 Jamesway incubators, each with a capacity of 10,800 eggs, are turning out new hatches of chicks every 22 days. The chicks are raised at the Albertson farm at Kuna, Idaho, where there are 20 houses, each 300 feet long, 40 feet wide with a capacity of 13,500 birds. Four additional houses are now under construction.

These buildings are of corrugated aluminum insulated with fiberglass and the interiors are lined with plywood. For ventilation control, each house is equipped with five 36-inch fans in the ceiling and 38 windows on each of two sides. The ventilation is controlled thermostatically.

The birds are soothed with music which is piped into the buildings.

Birds are moved to the processing plant at Nampa daily. Here they are killed and dressed at the rate of 1,500 per hour.

Albertson turkeys are raised somewhat differently. At eight weeks, after leaving the brooder houses, the poults are moved to a 100-acres sandy range at Emmett, Idaho, on the banks of the Boise River. Here they are fed from open feed bunks and brought to maturity.

Though chickens are sold fresh and frozen, most Albertson turkeys are frozen. They are sold under the Albertson Mountain States brand.

Albertson has clearly shown that vertical growth is a two-way street. If individual farmers can develop vertically into marketing organizations, Albertson has demonstrated that retail outlets can also become farmers.

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BALE MOVER

BOTTOM SECTION

$79 18-FT.

EXTENSION

$69 18-FT.

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GALVANIZED
CORN & HAY
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20¼ INCHES WIDE.....

100 BUSHELS PER MINUTE

10 ft. Counterbalanced Feeder Trough

Raises With Only 10 Pounds Lift. $95

$290 33 FT.

17 FT. $138

25 FT. $235

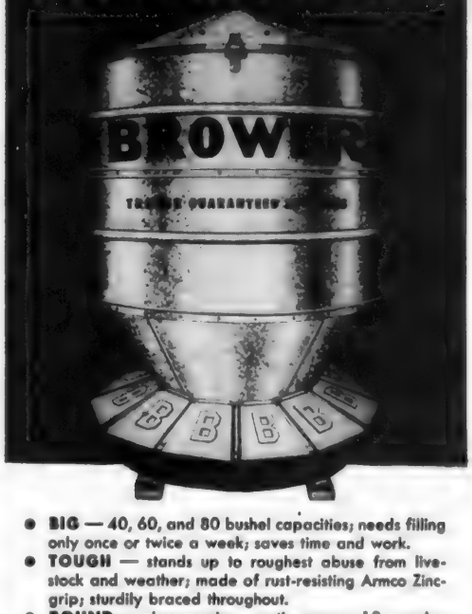
40 FT. $340

COMPLETE WITH CARRIAGE AND WINCH

MAYRATH

PRICES F. O. B. DODGE CITY, KANS., OR COMPTON, ILL.

BROWER'S NEW ROUND HOG FEEDER



- **BIG** — 40, 60, and 80 bushel capacities; needs filling only once or twice a week; saves time and work.
- **TOUGH** — stands up to roughest abuse from livestock and weather; made of rust-resisting Armco Zinc-grip; sturdily braced throughout.
- **ROUND** — gives maximum eating space; 12 oversize doors — plenty of headroom for largest hogs.
- **PERFECT** round kept by heavy steel brace around top; snug-fit top goes on and off easily.
- **30 YEAR** guarantee on cast iron trough; 15 year guarantee on heavy gauge steel trough.

WRITE FOR LITERATURE AND PRICES

BROWER MFG. CO., Box 5152, Quincy, Illinois

I DIG PIGS

(*Continued from page* 73)

one. So I rub pigs together. And here again I forget all concept of decency and rub that strange pig with the six rear ends of the others. I rub him thoroughly and all over. I also do not forget to rub him well behind. The reason is obvious. When this strange pig is introduced to his new mother, she may still suspect. And if she does she will smell where the smell is most certain.

In any event, you stay close by to see whether your new pig is allowed to graft himself in with the rest. And after you have successfully grafted the first one, don't be too quick about repeating the process. Let her get used to the extra pig. I am sure that sows can count. I had a Yorkshire once who gave me seven fine piglets and wouldn't lie down until every one of the seven was placed in the pen with her. Which should prove, I think, that whatever else you may have to say about a Yorkshire, it can count to seven.

In the matter of the so-called black teeth, the books are pretty definite. Take a pair of fine pliers and snip off those teeth both top and bottom or they may injure the sow. But any pig farmer has seen many a litter grow all the way from sausage size to weaning age complete with teeth and with no visible irritation resulting to the sow at all. At our farm, we ask the mother if the teeth are to be yanked or not. If they never seem

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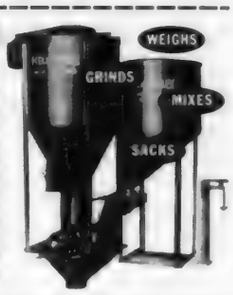

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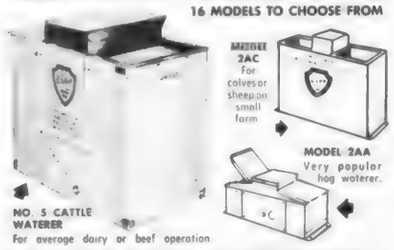

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to interrupt the music of her motor, we leave them in. At the first flinch, however, we take them out.

But I am wondering if those teeth ever give trouble when the sow has enough teats and ample milk. It always seems to be with the poor sow where teeth trouble occurs. Perhaps the pigs have to try too hard.

I often talk about a sow we had five years ago. She was indeed the counterpart of the runt sow in my hypothetical case. She had been a tail-ender in her young days. In fact, there was a time in her puny youth when I looked for the axe to knock her over the head. But I couldn't find the axe that day and she grew into maternity and presented me with thirteen struggling piglets. We did not think of transplanting in those times, and day after day we watched those thirteen pigs fighting for survival. I wouldn't say that they did very well, but they all survived. Then one evening just as we were beginning to think of weaning, we noticed a big ugly black scab on the cheek of each. My first thought was of rhinitis, though there had been none of that disease within many miles. I called in the local vet; he shrugged his shoulders and left some carbolic salve. I wasn't satisfied. I had a friend who was a veterinarian fifty miles away and I asked him to drive up. He looked the situation over carefully and said, "Well, I think these pigs have picked up some infection out of the soil." He left me some antibiotic salve.

Still the scabs persisted and every once in a while one would bleed. Then one Saturday as I was watching them nurse, I noticed a mean little critter fling his head sideways in an effort to knock his nearest competitor out of the way and I saw that competitor come up with a bloody face. Immediately the secret was out. Those pigs still had their black teeth and they were using them. The scabs disappeared three days after we applied the pliers.

The books are equally explicit when it comes to the matter of weaning and early feeding. We are told all pigs should be kept warm because they do not have built-in thermostats such as those possessed by other young domestic animals. One would won-

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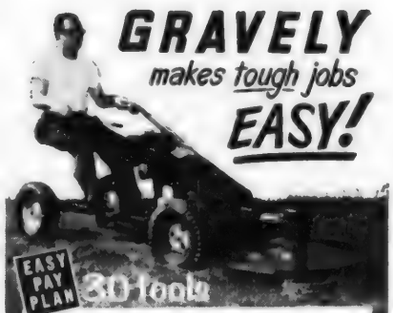

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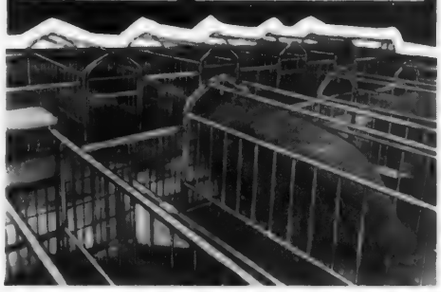

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der why the little beggars, smart as they always seem to be, wouldn't climb on top of their mother and keep warm that way. Only once in a while, one is smart enough. The only sow I ever owned whose entire litter would do that was a Minnesota No. 1. With her, soon as dinner was over, each youngster climbed on that portion of his mother's bacon nearest his teat, and there he crouched with his wary nose pointed toward that precious morsel like Launcelot guarding the Grail.

The books will tell you that 75 degrees is the correct temperature for piglets at weaning. And if you are a man who can carry a thermometer around with his jack knife, I suppose that is a good enough rule. But a much simpler way is to watch the flies. If the flies come out of hiding to cluster about the warm spot you have made for your weanlings, you can be fairly sure that the pigs are comfortable. Or if you have one of those stables which have no flies—these are often found in the books—then it is a good idea to watch the pigs themselves. If they persist in huddling one on top of the other for warmth, and are fighting for the best positions, they are still too cold. But if they strew themselves over the floor with no attempt to find bedfellows, they are not too cold.

Don't underestimate the importance of keeping your orphan pigs warm. No matter how tempting a weaning formula you set before him, a cold pig will not sample it.

There are many other things which one will never learn from the pig specialist, but I would not have you think that I am decrying the worth of these gentlemen at all. As they continue to write their books, I continue to read them and to add them to my library of pigology. With all the new developments in feeding, breeding and housing one cannot afford to be without the scholarly advice and findings of these men. No, they certainly have their place and I am glad that I have been able to make the acquaintance of many of them. Perhaps if I had the acquaintance of a few more, I could have been a pig specialist, too.

But to be a real pig farmer, you need to have more than the acquaintance of the pig professors. You have to make the acquaintance of the sow herself. And if you aren't Gaelic enough to talk her language, at least you should learn to understand it. She'll tell you a lot!

THE AUTHOR: H. Gordon Green is editor of the *Canadian Landrace Bulletin*.

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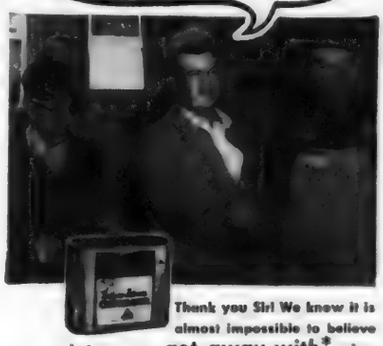

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JETHRO TULL

(*Continued from page* 62)

murky waters, in oven baked sand, and withering and dying in sea salt and in the salts of manure. He recorded his procedures so others could perform the same experiment and see the results—just as Tull himself duplicated the experiments of his contemporary, John Woodward, who first showed the difference in growth between plants grown in rain water and those grown in water from the River Thames.

In searching for the food of plants, or as they called it, the true pabulum, these early scientists believed they need only find which it was of the five elements they all agreed made up the world and everything in it: nitre, water, air, fire, and earth. Basing his answer on his own farming experience and on Woodward's findings that river water and water polluted with earth grew more vegetable matter than did rain water, Tull held firmly to the belief that though all five elements contributed in some manner to growth, earth was the true pabulum.

Nitre and "that acid spirit of the air which eats asunder iron bars," he claimed, are useful "to divide and prepare the food, and may be said to nourish vegetables in much the same manner as my knife nourishes me, by cutting and dividing my meat; but when nitre is applied to the root of a plant, it will kill as certainly as a knife misapplied will kill a man."

The experiments which caused J. B. Van Helmont and Robert Boyle to assume water to be the true plant food, he reinterpreted. True, in five years Van Helmont had grown a willow tree weighing 169 pounds 3 ounces in soil which had diminished but two ounces and had fed the tree nothing but rain water; and Boyle had performed a similar experiment with "a kind of Indian pompion." Van Helmont's and Boyle's mistake, Tull insisted, was that they did not understand the true nature of water. Water, he argued, was composed of minute, crystaline particles, like marbles, and in the spaces between these beads of water was earth. Therefore, Van Helmont fed earth with the water into the covered vessels.

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Richard Bradley, who came close to solving the riddle of Van Helmont's willow tree by claiming air to be the chief food, was dismissed by Tull as the "author of a fantasie." If air nourished plants, he claimed, it was by carrying particles of dust to them. Air, Tull contended, was to purify the sap of the plant through the leaves which were the plant's lungs just as the roots were its guts. "If water or air were the food of plants, I cannot see what necessity there should be of dung or tillage."

With logical reasoning and with sharp argument and sarcasm for his opponents, Tull hammered out his own theory of plant growth. Earth particles of invisible size were pressed into the mouths of the roots both by the weight of the pressing soil and by the expansion of the root itself in growing. Hard earth contained few such particles and plants growing in such land starved. Manure, as any farmer could see, broke the soil into the necessary small particles and therein lay its only value. Tillage, preferably with a heavy, horse-drawn hoe, was the best nourisher of plants and could be used exclusively.

It was a peculiarly appealing theory to Tull. It seemed to explain perfectly the reason for the success of the practices he had developed over a lifetime of farming.

Tull originally had no intention of becoming a farmer. He was forced into agriculture by what he described only as "an accident, or rather a series of accidents." He was born at Basildon, England, March 30, 1674, to an English landowning family. The details of his life are not well known. His first love was music and the organ. Next, he determined to enter public life and began his preparations for a career in politics. He attended St. John's College, Oxford, which he left without a degree when he was 17. He then spent three years making the grand tour of Europe, as was the custom of well-to-do young men of his day. He returned to study law at Gray's Inn and, six years later, was admitted to the bar. A month or two later, he married Susanna Smith of Burton-Dassett, a lady of good family.

Whether he considered his marriage to be one of the accidents which drove him to farming, he does not say. It is known, however, that upon being admitted to the bar and marrying, he suddenly gave up his life in London and moved with his wife to one of his father's farms in Oxfordshire.

As a farmer, Tull followed a pattern which is still quite recognizable—he fumed at high buying prices, low selling prices, and particularly the farm workers he employed. Tull's manner, which was described even by admirers as being irritable and intolerant was not improved by illness. His problems in dealing with his farm help must have been thorny, for all his life he was in torment; particularly with that most painful of diseases, kidney stones.

Soon after his move to Oxfordshire, the farm labor problem made him decide to shift his land to St. Foin or trefoil, a crop which would require few workers since it was a perennial and could be partially harvested with livestock. This was, as Tull said, "about the time when plough servants first began to exalt their dominion over their masters, so that a gentleman farmer was allowed to make but little profit."

The major difficulty in carrying out his plan was that trefoil seed was expensive, of poor quality, and was commonly sown at the rate of seven bushels per acre. Tull began to seek for a remedy by studying the nature of the crop. He discovered the crop grew best where there was roughly one plant per square foot, "yet the number of seeds in seven bushels sown on each acre, being calculated, amounted to one hundred and forty to each square foot."

He further discovered the exact depth at which trefoil germinated and grew best. Using this knowledge, Tull then had his workers prepare shallow channels for the seed, plant it sparingly, and cover it exactly. He planted 10 acres.

His experiment was a success. The trefoil grew better than on heavily seeded land. He saw that with trefoil he would have the upper hand over his labor. So did his workers. The next year, they struck. "I was forced to dismiss my laborourers," Tull said, "resolving to quit my scheme, unless I could contrive an engine to plant St. Foin more faithfully than such hands would do.

"To that purpose," Tull continued, "I examined and compared all the mechanical ideas that ever had entered my imagination,

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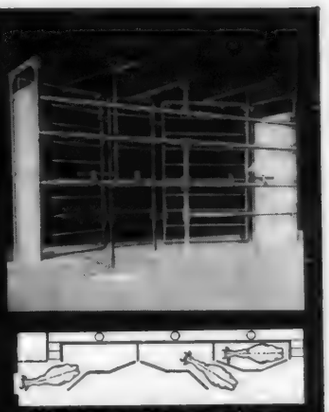

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and at last pitched upon a groove, tongue, and spring in the sound-board of the organ. With these a little altered, and some parts of two other instruments as foreign to the field as the organ is added to them, I composed my machine. It was named a drill; because when farmers used to sow their beans and peas into channels or furrows by hand, they called that action drilling."

The drill was used for planting Tull's own farm and many hundreds of acres of other land. He also developed a lighter model which planted turnip seed. With this one he added the refinement of planting half the seed at a greater depth to get a later emergence so that a part of the crop would escape the ravages of the turnip-fly.

Illness, Tull's constant companion, became severe in 1711 forcing him to leave England for the milder climate of France and Italy. This attack, which is described as a "chest complaint," kept him abroad for three years. Before leaving, he sold a part of his Oxfordshire farm and moved his family to his farm, "Prosperous," in the rolling chalk hills of Berkshire.

Tull, like most farmers on vacation, spent his convalescence studying the farming methods of southern Europe. "I took the first hints of my horse-hoeing culture," he said, "from the ploughed vinyards. After my return to England, I improved these hints by observing that the same sort of vinyard tillage bestowed on potatoes and turnips had the same effect on them as it had on these vines. So also in regard to corn (grain). I was thus confirmed in the principles which, by arguing from effects to their causes, I had formed to myself."

For his hoeing, Tull developed heavy, cumbersome two and three-pronged cultivators which he called bidens and tridens.

During the 17 years after his return from Europe, Tull continued his experimenting and observing and, by arguing from effects to their causes, building a theory of plant growth which satisfied him. In 1731, at the urging of many of his noble friends who were enthusiastic followers of his system, he published the first version of his book entitled *Specimen of a work on horse-Hoeing Husbandry*. This brief version of his famous book was immediately reprinted in Ireland—without a word of credit for Tull. The book was also attacked bitterly by Stephen Switzer and his followers. Switzer,

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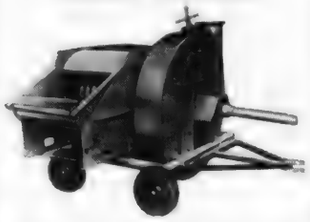

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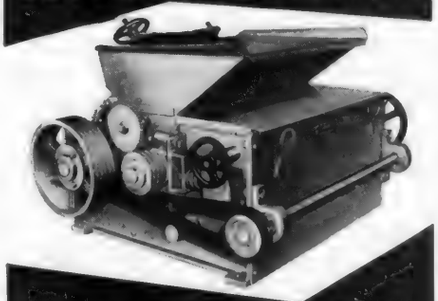

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W-W Grain Roller Mills are available in widths from 6" to 36". Adaptable to any installation or power system. PTO models available. Write for free literature, prices, and attractive time-payment plan.

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Use it for contour farming, determining lines and grades, snow fences, straight crop rows and anything that needs "leveling up." And for erecting farm buildings and for many other day-to-day jobs.

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a progressive agricultural writer, should by all logic have supported a fellow innovator.

Tull bristled under attack. "They are not content with abusing my vegetable principles, and terming me as an atheist," he complained, "but also describe me as . . . infidel, fool, mente captus, madman, ass, owl, viper, carping insect, etc., all feminine arguments of scurrility."

Tull resolved not to answer his critics nor write again. His friends, however, prevailed on him to put out a more complete edition of his work and in 1733 *Horse-Hoeing Husbandry* was issued. Many years later, Tull published a mass of material as *Notes* which were his afterthoughts designed to be read with the book.

Tull was the 81st agricultural writer in England since the invention of printing—the 49th, according to Lord Cathcart who disposes of the other 32 as "dross."

Though he was attacked by some, Tull's book and the cumbersome body of notes was enormously influential. The agriculturists of England read it and followed its teachings and even in foreign countries men like Voltaire and George Washington owned copies of *Horse-hoeing Husbandry* and made copious notes from it. Tull showed them how to reduce seed requirements to a quarter of what they had been planting and yet increase yields: he gave them the drill which would plant even rows which would enable them to fight the weeds; he led them to believe they could dispense with manure which was a great carrier of weed seeds, for tillage alone will create and supply the food of plants; he taught them that perpetual crops of wheat on the same land without manure were quite possible and pointed to his own 13 continuous crops. And all of this could be accomplished if the farmer would but use the plow (as an animal uses his teeth to break up the food) and the horse-hoe (which like the bile and pancreatic juices reduces the food to absorbable particles) so that the plant could swallow the soil into its roots or guts.

Though he was mistaken in much of his theory and though his promises for his followers were exaggerated, Tull did change the face of agriculture. He was indeed modest when he said, "Some, allowed as good judges, have upon a full view and examination of my practices, declared their opinion that it would one day become the general husbandry of England."

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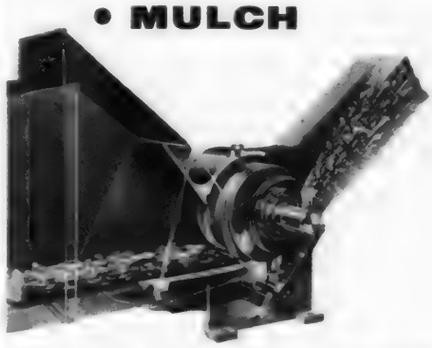

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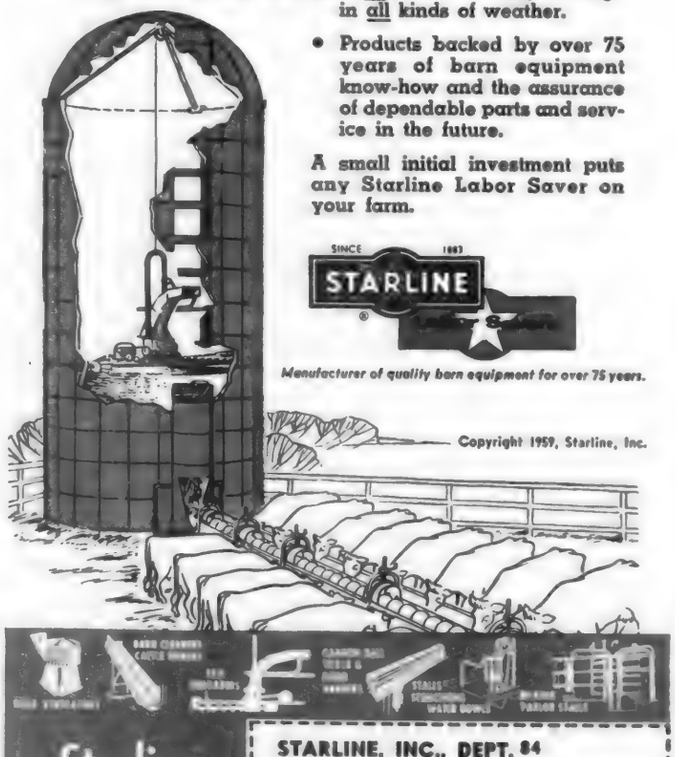

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WELL BOUGHT IS HALF SOLD

(*Continued from page* 55)

it, calves or the lighter kind of yearlings. If you're long on corn and concentrates you'll want bigger cattle you can turn right in on it.

"If you're in a spot like eastern Nebraska here where there are good outlets for heifer meat, heifers are a good buy. And down in southern Kansas and Oklahoma they can move a lot of light fat heifers that'll weigh only 700 to 800 pounds when they're finished. You want the plain kind for that market. Those packers won't pay much for quality. They are more interested in size."

The cattle in which Diedrichsen deals come most from the Sand Hills of Nebraska, from the Dakotas, Montana, Colorado, and Wyoming. He points out that like cattle from any other locality, these follow a pattern of their own.

Diedrichsen's Types

Calves—"Buying calves is like buying strawberries," he says. "To get the best you have to get 'em when they're picking 'em." Normally, the best calves are sold from the end of September to the first of December. The feeder who buys them usually expects to keep them 10 to 14 months. He wants uniform, good quality cattle. Since they are light weight the initial premium he has to pay for quality does not mean much by the time they are fed out. Quality here means an animal which runs true to its breed type; a short, thick, square-headed calf on short legs. A good coat of hair is one of the best indicators of good quality. "The beef breeds, particularly the Herefords, Shorthorns and Angus, are always long haired," Diedrichsen points out. "The dairy breeds have short, slick hair. When you see a slick-haired calf, look out." The condition of the coat is also an important indication of health.

Feeder buyers like loose, mellow-hided cattle. The tight-hided kind are frowned on not because anyone really believes they are unable to hold the feed but because experience has shown a tight hide often means poor quality and a poor gainer.

Yearlings—600 to 650 pounds—A lot of these go to Illinois and Iowa to glean fields and clean up roughage; then they go to dry lot. This kind can be bought the year around. Top quality requires the same specifications as for the calves.

Yearling Heifers—600 to 700 pounds—This kind is usually started on grass or greenchop corn. The usual feeding period is 100 to 130 days. These heifers are among the first cattle to move in the summer. Their buying season runs from the middle of July until the first of October. They can usually be bought a dollar or two a hundred cheaper than steers of similar quality, and finish faster than steers. They are always in demand and bring a good price. (Caution: Be wary of bred heifers.)

Bigger Yearling Steers—650 to 800 pounds—These can be picked up from about the middle of September to the first of January. They are frequently taken home to clean up cornfields, then work their way through silage to the high concentrate rations. They are marketed the following summer and fall as prime.

Two-Year Old Steers—850 to 1100 pounds— August and September see the best of these on the market. The feeder pours the rich feeds to them as fast as they will take it. Fill and weighing conditions are vital in buying this kind. A man buys 1000 pound steers expecting to feed them out in 80 days. If these steers are carrying a 40-pound fill when they are weighed to him, he starts with a handicap of a half pound a day. Gilbert Bolz, a Stanton, Nebraska, feeder and a Diedrichsen customer, asked what he likes to see in cattle, said, "I like them empty." Diedrichsen added, "If an amateur sees a bunch he likes he forgets about fill. I discount cattle carrying a fill and if they're too full I just won't buy them."

Plain Quality Cattle—This kind are available all year. They will never grade higher than good, are often dairy bred steers or dairy-beef crosses. Diedrichsen cautions, "There are plain cattle and there are plain cattle. You've got to buy medium plain cattle for medium plain money. A lot of feeders claim they can make more money on them than on quality stuff. It's like buying a used car. Anybody can order a new car and be reasonably sure of getting a good buy; a used car is another matter. You can buy choice cattle by phone but you'd better take a real good look at plain stuff."

Put-together Cattle—These are lots of one, two, three, maybe

four cattle, of various kinds and quality which can be picked up much cheaper than a uniform load. The hitch is trying to make a uniform bunch out of them. Diedrichsen advises the smaller operator to let them alone. The man who can use them to advantage always has upwards of 150 head in his lots and can sort and match these odds and ends. Diedrichsen cites one client who usually has a thousand or more cattle of various weights and degrees of finish. "I buy him one, two, three, fifty, a hundred at a time. I often save him a hundred on them. He usually wants 500-pound cattle, so that's a saving of $5 per head. On a thousand head a year, that's a neat little saving of $5000.

"You can buy a lot of good off-colored cattle, brockle faces, red necks, line backs, at discounts of $2 to $3 this way, too. You just have to know your customer. There are glory feeders and money feeders. The glory feeders won't touch the off-colored stuff; the money feeders will take all you can send them at the right price."

Where to Buy

Diedrichsen prefers the auction markets and the range country. He concedes that when you buy at auction "you are paying more than anyone else in the place is willing to offer, and you want to be darn sure of what you are doing." Still, he feels he does not get the same selection or opportunity to bid on the terminal markets.

His rules for bidding are simple. "I want to be right there in the front row," he says, "so I can see those cattle just like I was standing among them. I want to be in a spot where I can see the auctioneer and he can see me and I can signal him without a lot of hoopla and commotion.

"I won't bid in 25 or 50 cent jumps. I never give more than a 5 or 10 cent bid. If the auctioneer is asking for $29.25 and I bid a dime and get the cattle, there's the commission saved right there."

Diedrichsen seldom sizes up the offerings in the yard before the sale starts. "You don't want to set your mind on any particular bunch and wait for it," he warns. "There will always be three or four other fellows who will want it at least as bad as you do and make you pay high for it. And you never want to pass up anything that will fill your order because you expect you may get something better later in the sale.

"When you see what you want, go after it. Don't let your enthu-

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siasm carry you away, though. Have a definite idea of what the cattle are worth. If you haven't bought them by the time they reach that point, quit."

Shrink and Fill

Fill, as has been pointed out, is poison. "In buying cattle on the range," Diedrichsen says, "I have an understanding with the rancher to get them off bedground early in the morning and weigh them before they fill.

"There are various arrangements for handling shrink. If there is going to be a short haul before the cattle are weighed and they are a little full, I ask for a three per cent shrink. If the haul is going to be from 20 to 30 miles, I ask for a two per cent shrink. If the man hasn't filled the cattle and has hauled them a piece I only ask for a one per cent shrink.

"In some areas, if you ask a man for shrink he'll run you off the place," Diedrichsen warns. "Other places they expect you to ask for it. If you can't get shrink you simply try to buy cheaper. Some ranchers will give shrink in order to try to beat their neighbors on the price."

Some sellers will, for a premium, guarantee their heifer to be open. A common agreement is that $20 will be refunded for every heifer found to be pregnant within 90 days after delivery. But if the seller knows more than 25 per cent of his heifers are liable to turn up calfy, he probably won't guarantee them, one of Diedrichsen's fellow feeders points out. On the other hand, if a buyer paid $2 per hundred pounds for the guarantee on one hundred 700-pound heifers he would pay $1400 for a refund unlikely to run higher than $500.

Diedrichsen doesn't like to contract feeder cattle for future delivery. "One of the parties is always going to be unhappy," he says. "If the market goes up before delivery, the seller is going to be dissatisfied. If it drops, the buyer won't like it."

He has misgivings, too, on the various arrangements where the rancher or a middleman retains title to the cattle and the feeder feeds for the gains. "That game's like poker with one-eyed Jacks and deuces wild. Some of the feeders who are experienced and know the men they are working with get along all right. But the newcomer is almost sure to get honked the first few times. Most of those contracts have more holes than a haystack," Diedrichsen said. "In fact, I can show you a young fellow right now who's losing money hand over fist because he contracted to feed the wrong kind of cattle for 20 cents a pound.

"Some of those contracts specify the cattle are to be weighed at 4 o'clock in the afternoon on the stockyard scale before

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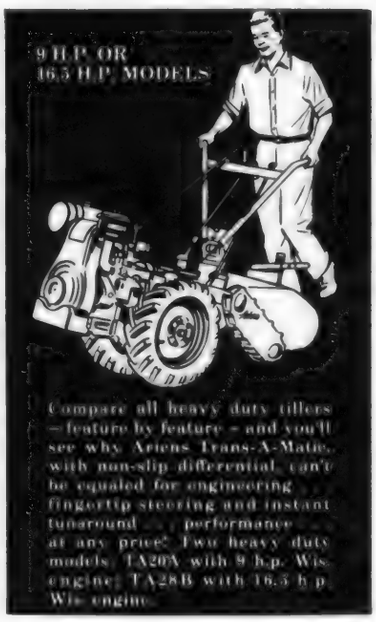

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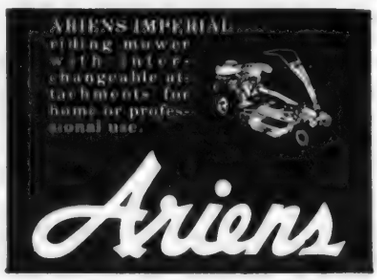

117 Calumet Street
Brillion, Wisconsin

they go out to the farmer. By that time they're so full they're ready to bust. Then when they come back to the yards they are weighed right off the truck and that guy gets honked again."

The health of the cattle is, of course, of prime importance. "The amateur doesn't know what to look for," says Diedrichsen. "You always keep your eyes open for sore feet, lumps, bad eyes, a rough hair coat.

"The minute a calf doesn't feel good his ears droop, his nose is dry and his eyes sink into his head. If you see one animal gaunter than the rest, you want to get suspicious. If his hair is rough, look out!

"That roan steer," he continued, pointing to a well-made yearling in a bunch coming into the auction ring. "He's been foundered. Look at those long, flat feet. You want to be head shy of that kind.

"And look at that one with the dirty back," he went on as a lot of calves made their appearance. "He's thumping; he's thin; his ears are drooping, his nose is red; the rest of 'em are pushing him around. He's a real sick calf."

As one lot after another moved through Big George went on: "There's an ill-shaped, sway-backed, high-hipped critter.

"These heiferettes are nice. They'll make darn good beef. One has had a calf; you can tell by her bag.

"Here's a common steer, but he's pretty good. Look at his brisket, solid and full. But he won't have any steaks.

"Here are a bunch of springers. You want to watch them. They never stop shrinking when you butcher them. When heifers are straight and open, though, they yield good.

"There's a green stock steer. You couldn't give him to a man buying good cattle . . . Now here are some good haired, good backed, mellow-hided cattle. They have young horns.

"This is a real plain steer. No hips, no bones. Every day he'll get uglier.

"These are southern cattle. See that buckskin strip in the crotch. Seems like all the cattle we get up here from Louisville and Texas are marked that way.

"I don't think I'm going to buy a thing today. I'll be doing my customers a favor. It's getting pretty dry out in that range country. If it doesn't rain over the weekend these cattle will be cheaper Monday. If it does they won't be any higher. Let's go have a steak."

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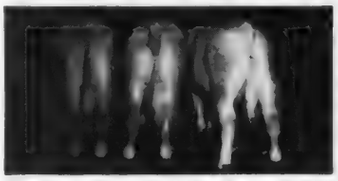

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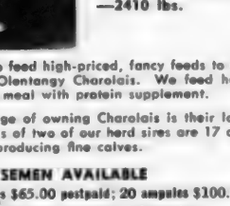

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FERRO CORPORATION

4231 East 56 St., Cleveland 5, Ohio

LOW COST GRAIN DRYING

(*Continued from page* 85)

just starting to pick and crib. From then on the fans were operated every warm day until October 31st when a sample tested 12½ per cent with the top layer 13½ per cent. We considered this dry enough for safe storage and turned off the fans.

A total of 1175 kilowatt hours of electricity were used in drying this 6500-bushel bin of corn. At our rate of 2 cents per kwh, this figures $23.50, or a little over ⅓ cent per bushel. This exceptionally low cost was the result of starting with rather low moisture corn and drying during a period of high temperatures and low humidity. With temperatures averaging 66 degrees and average humidity 38 per cent, it was not necessary or feasible to operate the fans at night. Last fall's favorable weather resulted in very fast drying.

We found several gadgets helpful in the operation of our dryer. A moisture tester is desirable and a sling type psychrometer is useful for checking humidity. Then we made a water manometer out of a U-shaped glass tube, some small rubber tubing, and a six-foot length of quarter-inch pipe. This device is used to measure air pressures in the ducts and various parts of the bin. Add a thermometer to check grain temperatures and you have everything needed.

We measured the small pressures with a manometer in inches of water. In our installation, with corn 5½ feet deep and both fans operating, the static pressure measured ⅞ of an inch in the main duct and ¾ of an inch at the bottom of the bin. At this pressure our fans, 3 and 5 horsepower, are rated to deliver a total of 27,000 cubic feet of air per minute. On 6500 bushels this figures 4.15 cubic feet per minute per bushel which conforms with USDA recommendations for corn about 23 per cent moisture. In addition to selecting the right fans for the job, it is important to use ducts large enough to handle the volume of air required.

Moisture and temperature readings during the drying period revealed some interesting facts. The corn at the bottom of the bin dried down to 12 per cent almost immediately. This zone of dry corn moved steadily upward but there was no appreciable drying of the top layer until all the corn below it was dry. The exact position of this drying front could be determined by probing with a broom or fork handle. When the dry corn was reached, the handle would

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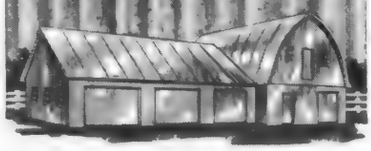

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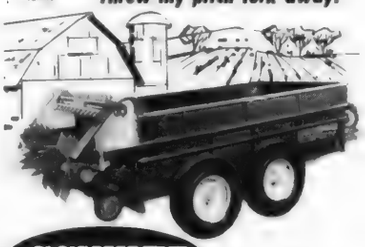

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push down much easier. Another test is to walk on the corn. If you sink an inch or so, the top layer is still wet. If you sink half way to your knees, the corn is dry.

As long as the corn was wet, its temperature remained around fifteen degrees colder than the air blown into it. This cooling is due to the evaporation of corn moisture and is important in reducing molds.

There are some obvious advantages to in-storage drying with unheated air. The low operating cost appeals to everyone but the low initial cost should appeal especially to the smaller farmer. Moreover, this same equipment can be used for all farm drying including grain, seed crops, shelled or ear corn and loose, chopped, or baled hay.

With in-storage drying, grain is moved only once, from wagons into the drying bin. There is no limit to the amount that may be harvested per day and very little supervision is required except to turn fans on and off according to weather conditions. The corn we have dried so far has graded number 1 yellow, the highest grade obtainable.

There are some disadvantages to unheated air drying, too. Since grain depth is limited, much floor space is required. Then there is a practical limit to the moisture content of corn that can be dried with unheated air, perhaps around 25 per cent. However, 26 per cent has been found to be an ideal moisture for field shelling.

Of course, the most serious disadvantage to unheated air drying is that it is dependent on weather conditions. In a spell of rainy, humid weather with the corn still high in moisture, the fans must be operated to prevent heating even though little or no drying is possible. Unfavorable weather could delay drying until late fall and cold temperatures arrive. In this case, the corn can be frozen and drying completed in the spring.

If air is heated only a few degrees, its relative humidity is greatly lowered. Making use of this principle, several crop dryer manufacturers have recently developed supplemental heat units which promise to give a certain independence from the weather. These units are designed to add small amounts of heat to the air entering fans of cold air systems and are recommended for use when conditions are unfavorable for natural air drying. They make continuous drying possible in unfavorable weather.

Our dryer and bin measures up to all our hopes for an efficient, handy, low-cost tool. If at any time in the future it becomes necessary to add supplemental heat it will be a simple matter to do so.

THE AUTHOR: An agricultural engineer as well as a farmer, Fred Hawthorn still finds time to do some writing. This is his second FARM QUARTERLY article.

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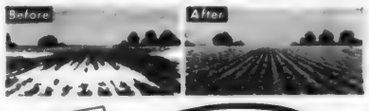

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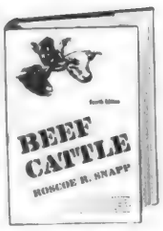

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RANGE FERTILIZATION

(*Continued from page* 66)

tilizer hauled in 26-ton bulk loads and stock piled on the ranch airstrip during September and October. Other Seiden customers have worked out a system with trucking companies to have compartment-bin trucks deliver loads of from 20 to 26 tons at designated times and wait while the plane-loading rig unloads the truck, a plane load at a time. Since they can fly a truck-load of 26 tons in 2 or 3 hours, the stopover is not excessive for the truck line.

Skip Seiden has worked out his own plane loading rig which loads a plane in 25 seconds. With four pilots and a five-man ground crew, Seiden must plan every operation to save time.

On the Alexander job, he plotted the range area and determined the length of runs on each section of land. Then, with two planes working, he applied from 1400 up to 1600 pounds of fertilizer every four minutes at 240 pounds of 16-20-0 per acre. He worked the two planes as a pair, one taking off, one coming in. It took one minute to load each plane, two minutes to fly it on, and one minute to return and load.

"Once you get the rhythm set with the crew you can really make time," Skip explained, "that's why I like bulk handling of fertilizer. It saves time and money for both the rancher and the plane operator."

In setting up this operation, Seiden tried to plan each run, and the load the plane carried, so that the fertilizer broadcast would come out right with the plane heading in the direction of the airstrip as it emptied its load. This kind of mass production efficiency wins Seiden a good deal of kidding from the friends who know that his triplets, Robin, Nancy, and Virginia, were delivered by a hard-working obstetrician exactly one minute apart.

Skip's aerial planning pays off in a lot of work done in a short time. On the Bear Creek ranch at Auburn, for example, he seeded 6000 acres in one day. For this job he used two planes and applied 5 pounds of seed per acre. He averaged 400 acres per hour per plane at a cost of 40 cents per acre. His planes flew steadily for seven and a half hours. "For the last few runs before we finished my flagmen had to use flashlights for flags," Skip said.

Skip's boys flew on 160 tons of ammonium sulphate for Ross Noonan near Fairfield. Another rancher in the Sacramento County area had him fly on 200 tons of ammonium sulphate on corn stubble to promote better bacterial decomposition of the corn stalks.

It Must be Fed to Pay

A western rancher is going to consider aerial application only when he is convinced that range fertilization will pay on his ranch. On most ranches, fertilization cannot be considered a get-rich-quick proposition. Some years on most ranches and most years on some ranches range fertilization will barely pay the cost of fertilizer

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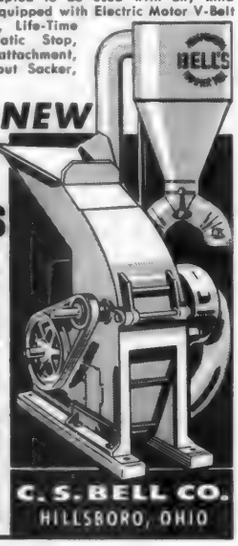

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plus application. Most ranchers will want to experiment as Alexander did. There still remains much to be done in determining how heavily we can fertilize, how many years its residual effect will be of value, the ratio and mixture combinations best suited for each of the hundreds of soil types, and how its cost of application can be lowered.

For example, tests run in nine California counties in 1955 showed from 40 to 242 extra pounds of beef produced per acre. The extra meat produced cost from 6.6 cents to 20.7 cents per pound to produce. Stated another way, fertilizer returns ran from a profit of $21.89 per acre to a deficit of $14.12. In seven of the tests the average gross profit was near $15 per acre. In three tests the extra beef was equal to the cost of the fertilizer, but not enough to pay the cost of its application.

One mistake is applying fertilizer for early feed and failing to have extra livestock on hand to harvest it, or getting the stock on too late when the grasses mature and lose palatability and nutritive value.

"Another problem raises its ugly head," Alexander cautions. "Along comes the Board of Equalization and thinks you've increased the value of your land and wants to raise your taxes. I've argued the point with them that range fertilization is a yearly matter that must be repeated to maintain land values, not to increase them."

One of the side problems that range fertilization is helping to solve is the encroachment of the weedy annuals and unpalatable plants that can survive better on poorly fertilized soil than the highly palatable, good quality grazing plants. Fertilizer gives the better plants the advantage they need over these weeds. In some cases, reseeding with the seeds of the more palatable plants is carried on along with the fertilization.

Over the long haul, most livestock producers are using range fertilization to improve the current feed supplies and to help build up the general soil fertility. Many of these ranches have been grazed for 50 to 100 years and when you consider that every 1000 pounds of beef produced off the range takes with it 50 pounds of phosphorus, you see the need for replacing this and other soil nutrients. Ironically enough, it may be the airplane or the helicopter that will replace the soil nutrients that the broncoriding cowboy herded off the range.

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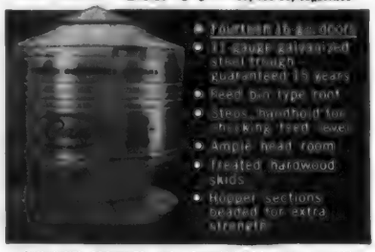

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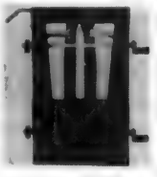

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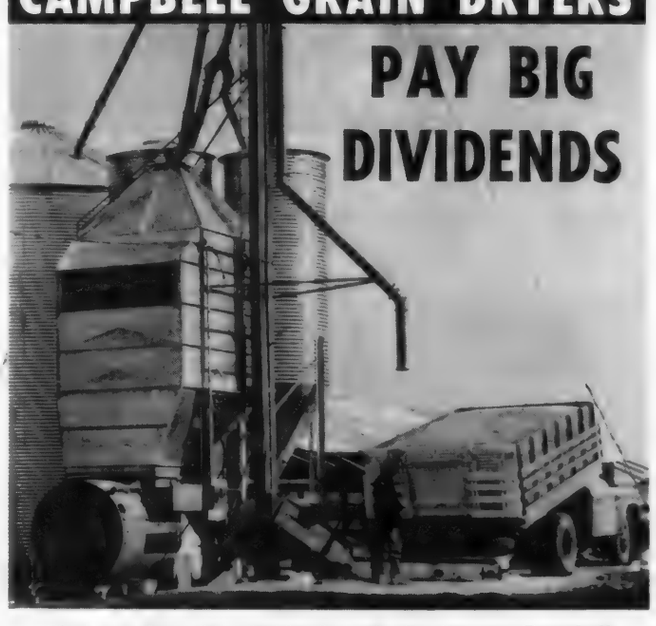

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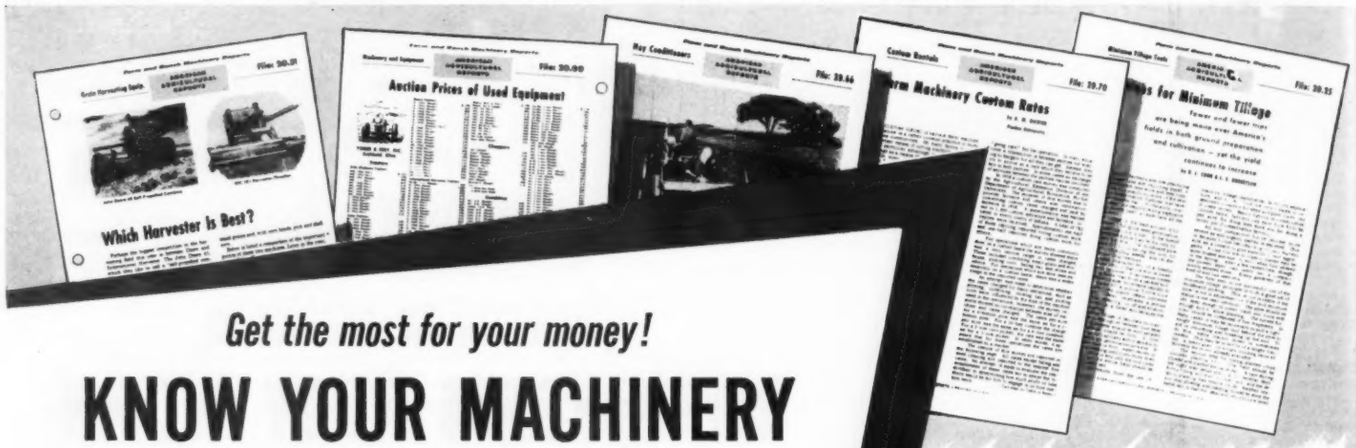

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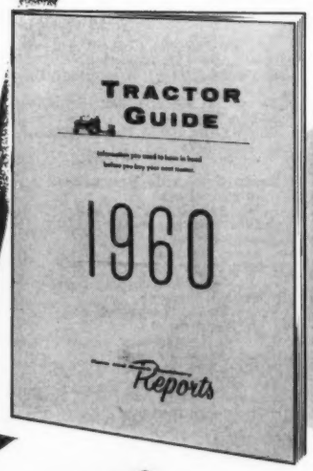

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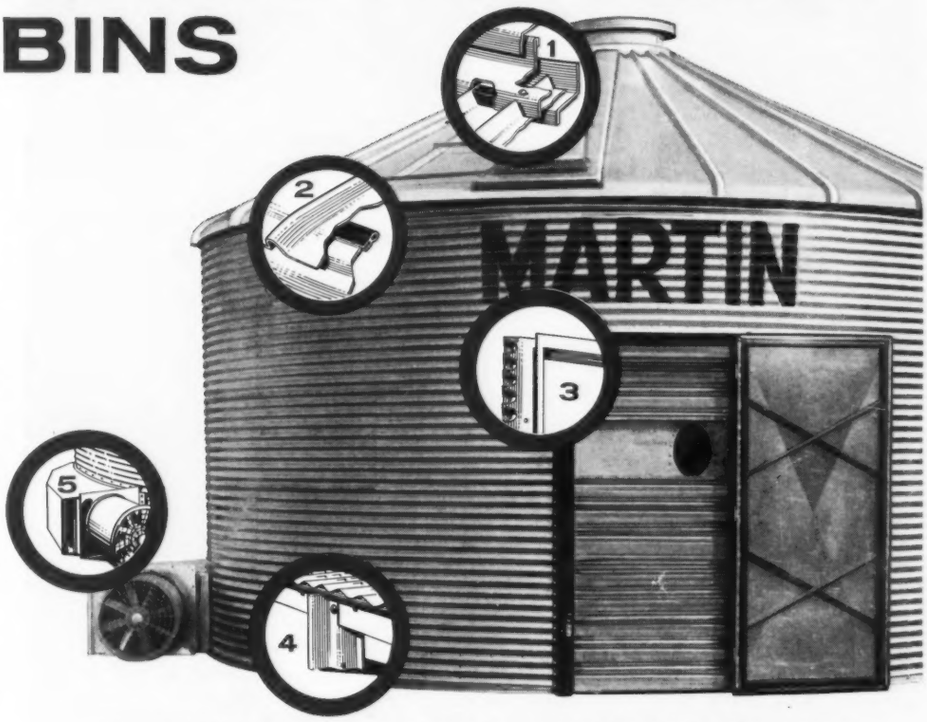

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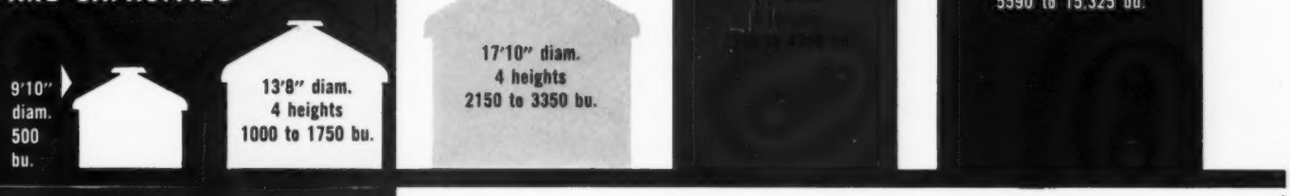

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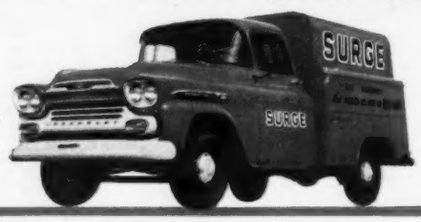

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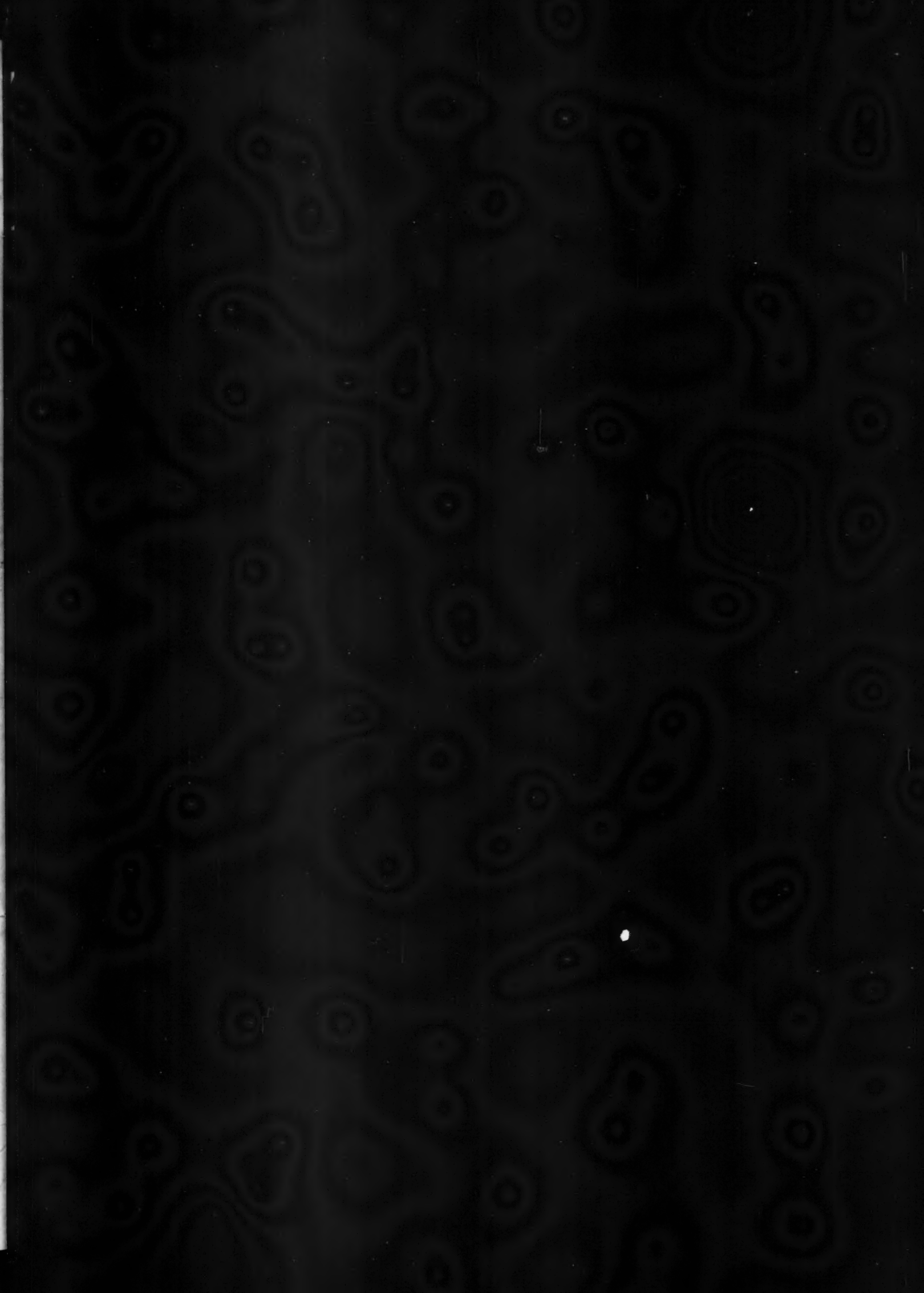
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